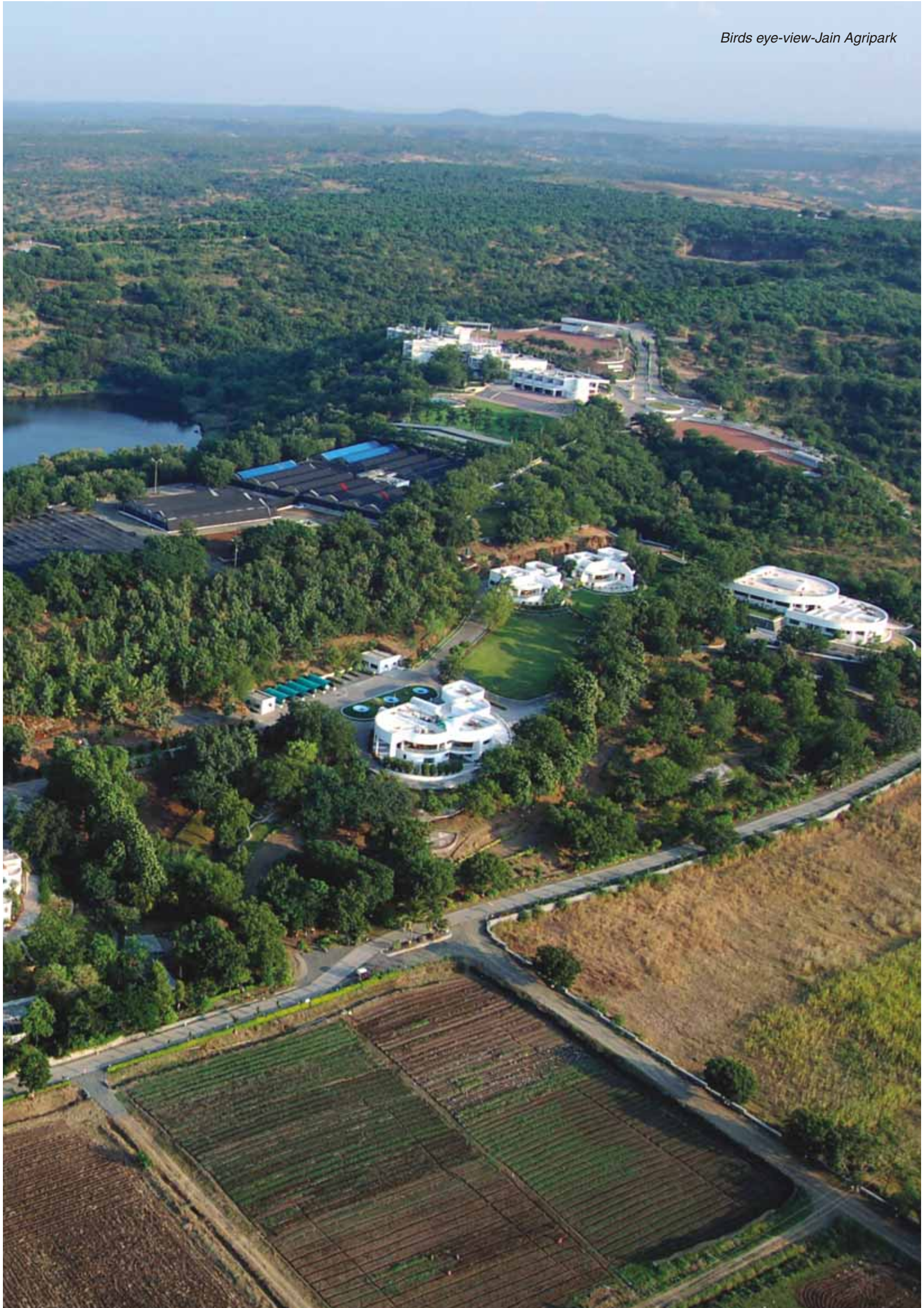




Future breed of Agri-Scientists germinate here in Jain High-Tech Agri Institute (JHAI), Jalgaon-India.







Padmashree Dr. Bhavarlal Jain,
The visionary founder Chairman

Founder Chairman's Conviction

The Founder inherited farming instincts. Moreover, as a first generation entrepreneur, he also had hands-on experience regarding all aspects of farming.

A strong desire and determination to establish cutting edge technology propelled him on growth path with these convictions:

- In India, 70% of over 1 billion people are associated with agriculture. Agriculture symbolizes their culture, not only their economy.
- Transformation of our agrarian society into an industrial society will take centuries.
- In the meantime, there is no escape from taking the help of Science & Technology for agriculture, agri-business and agri-industry.
- Such an approach alone can ensure long-term food security, sustainable & inclusive growth and self-reliance.
- No other sector's progress, howsoever phenomenal, can substitute the development of agriculture.

—April 1979

There is no gainful agriculture without irrigation. Therefore, availability and management of water holds the key for future agricultural progress—its production and productivity. “More Crop Per Drop” should become a national priority.

—March 1991

Availability of water by itself does not guarantee higher productivity or production. Irrigation water has to be pumped right up to the farm boundary and thereafter distributed up to the root zone of the crop.

Growing population, urbanization, industrialization and cropping intensity will reduce overall availability of water for agriculture and increase the need for energy. Hence, water without energy or shortage and poor quality of energy will continue to be a bottleneck for future agricultural growth.

In keeping with our “conservation” theme, we shall promote use of green energy not only for homes or industries but also for agricultural applications. —June 1995



Jain High-Tech Agri Institute

Training and Extension Services





Jain Hi-Tech Agri Institute (JHAI)

“I have a dream to change the way Indian farmers do agriculture

from the present state of cropping depending on water availability to a state where water should be made available to suit their choice and need of cropping” says PadmaShree Dr. Bhavarlal Jain, the Founder Architect of Jain Irrigation Systems Ltd (JISL).

Mr. Jain has realized very early in his life that farmers who form more than 70% of the population are the future of this great country. It is this belief that made him, with degrees in Commerce and Law, shy away from a lucrative government job to start a business in an area very closely laced with Agriculture.

The industrial enterprise began with grouping of farmers and teaching them to grow Papaya for the extraction of papain, an industrial enzyme with scope for export. Thus started a contract farming practice in 1978, a model that he developed which is a much discussed one and it proved to be the most successful model in India. Farmers from Maharashtra, Madhya Pradesh and Gujarat participated in this contract farming venture and supported Mr. Jain. Collateral to this highly successful business activity, something very transient

at that time and later to develop into a major activity by Jains was also born- Training and Extension in its most practical way.

Jains firmly believe that provision of technologies to high precision high productive farming begins with farmers learning about the technology. The progenitor of technologies in Agriculture in this country should take upon themselves the task of educating the Indian farmer first about the application of the technology before transferring it to him. This strategy becomes critical when it comes to micro irrigation technology; having a bundle of physical components and a spectrum of sciences—Physical, Material & Biological sciences interplaying in a very intricate combination. The concept selling strategy adopted by Jains necessitated the development of a high- tech training institute:

Jain High Tech Agriculture Institute (JHAI) in Jalgaon, Maharashtra state of India.



Board of Directors

With a Mission to Leave this world better than we found it and a Vision to establish leadership in whatever they do, Jains have strived through strain and stress to do the noblest. There is nothing nobler than educating a rural soul to grow crops in the most productive and sustainable way. That is the motto of JHAI. Through this motto Jain Irrigation company teaches everyone to earn in an efficient and economic manner while upholding a larger commitment to its social responsibility and the principle of environmental sustenance.

The idea of starting a training centre with farmer as a focus to provide them state of the art training in modern irrigation technologies and cultivation packages led to the extension of that training to generate pools of technically qualified and practically oriented manpower whom we call trainers. With the merging of the above two factors JHAI became a centre of excellence in Agriculture training.

JHAI comprises a sprawling 1250 acres hilly terrain managed by following the most modern principles of terrain and land management and converted into a text book case of watershed with adequate facilities for demonstration of agricultural technologies, rain water harvesting, aquifer recharging and environmentally sustainable water utilization for agriculture. The amazing accrual of various scientific principles in the formation of this R& D and technology promotion farm itself is a vital part of JHAI. Besides, the rustic rural way of "seeing is believing" is whole heartedly accepted in anything and everything in the functioning of JHAI.

The uniqueness of the Jain R & D farm is in

- (i) The land, water & soil management system adopted for farming and water harvesting.
- (ii) The bold decisions to try out the crop not usually grown in this area, of extremely shallow soil, low and erratic rainfall.
- (iii) Live demonstration and practice of a world class water management technology for a wide range of crops.
- (iv) Promoting students for research, practical training and capacity building of farmers.

JHAI also has state-of-the-art class rooms equipped with latest multimedia and training and extension aids, accommodation facilities, besides a team of highly qualified and experienced faculty.

The courses are designed to provide the learner

- (i) A broad background of hi-tech agriculture.
- (ii) A very practical knowledge of efficient input management, especially irrigation and fertigation.
- (iii) Precision farming packages for all crops.
- (iv) Harvest and post harvest management.

The procedure followed provides 45% time for class room discussions and 55% for field work. This unique division is aimed at building confidence and generating manpower that is not shy of field work.



Infrastructure for Training & Extension Services

- AC lecture halls- 6 (Two large class rooms (250 and 70 seats) with multimedia
- A multicrop farm with modern technology inputs
- Live demo of land, water and soil management systems
- Live demo of watershed management
- Live demo and training on practical aspects of micro-irrigation and fertigation
- Live demo on practical aspects of renewable energy (biogas and solar energy)
- Continuous research plots for major crops
- Nursery: more than 2 acres
- Farm machinery
- Vermicompost sheds
- Bio technology and bio fuel laboratories
- An analytical lab with the most modern equipments
- Soil and water analysis for the farmers installing MIS
- Well equipped Laboratories
- A well equipped Desk Top Publishing house
- Audio-visual aids, LCD Projectors
- Library, internet, LAN facility
- Accommodation for upto 100 trainees at a time
- Nutritious vegetarian food/ refreshment is served in the premises
- Three spacious grounds [having a capacity of 2000, 5000 & 10,000 invitees] for exhibitions/ farmer melas/ trade fairs/ symposia
- Transport and technical support for the interaction with farmers having crops with micro-irrigation system
- Helipad



Programmes on offer

Type of training	Target audience	Duration
Trainers	Training faculty	2 days
Dealers	MIS Dealers	3 days
Bank officers	Agriculture officers	3 days
Govt. officers	Related to Agri/ Extension	5 days
Farmers	Farmers from various states	5 days
New Associates	Newly recruited staff	6 days
Overseas	Farmers/ Agri. Officers	15 days
Refresher course	Existing Associates	15 days
New associates	Agronomists/ Agri. Engg.	1 month
Vocational MIS programme	12th pass/ drop outs	6 months
P.G. Research	M.Sc./ M.Tech/ Ph.D. Students	1-2 Years

Medium of instruction: English, Marathi, Hindi and other regional languages.

Method of teaching: Interactive sessions, visit to live demo, practical field and lab work.

Training Modules: Some of the thrust areas of training are surveying, design, installation and maintenance of micro-irrigation systems, with soil and water conservation and management, crop management, modified agronomical practices for crop production, organic farming, bio-fertilizers, bio-pesticides, organic manures, vermin-compost, green house/shade house cultivation, and fruit and vegetable processing.

The various training modules for different target groups from India and abroad include farmers, Govt./bank officers, dealers, students of agriculture, company associates. Specialized courses are tailor-made for different client groups.

Course content

- Role of meteorology in agriculture
- Soil and water conservation
- Plant propagation and nursery management
- Dry land farming
- Agronomy and production technology of crops
- Integrated pest management (IPM) and extension.
- Water management in various crops
- Survey, design, installation and maintenance of micro irrigation systems (Drip and Sprinkler)
- Fertigation, organic manures, vermicompost
- Green house/ shade house cultivation
- Fruit and vegetable processing

In addition, short-term/ summer training courses are imparted to the students of B. Tech. (Ag. Engineering) in micro-irrigation and M. Sc. (Biotechnology) from various Universities.

Technical/ Summer training courses organized

Year	2005	2006	2007	2008	2009	2010	Total
Micro-irrigation Trainee Engineers	64	156	209	160	192	235	1016
Agri. Students	-	-	80	114	142	166	502
Biotech students	-	33	72	75	17	2	180
Total	64	189	361	349	351	403	1717



Farmers' Training/ Visit at JHAI

State	2003	2004	2005	2006	2007	2008	2009	2010	Total
Andaman						38	9	47	
Andhra Pradesh	291	360	375	458	375	640	640	506	3084
Arunachal Pradesh						15		15	
Assam	71	399	34	82				25	611
Bihar	50	50	50	50	59	55	58	101	473
Chhattisgarh	302	259	48	72	92	245	81	14	1113
Goa				32				32	
Gujarath	771	1012	437	885	1043	1111	1182	711	7152
Haryana	9	22	20		70	15	72	64	272
Himachal Pradesh				30	56	80	77	41	166
Karnataka	180	122	114	169	344	290	1481	1111	3811
Kerala						34			34
Madhya Pradesh	363	160	304	1340	3155	2287	2570	3128	13307
Maharashtra	6039	2977	17245	2732	4651	10683	8202	7406	59935
Manipur	25								25
Nagaland								60	60
Orissa	186	52		55	54	20	131	188	686
Punjab		35		98	56	34			223
Rajasthan	31	24	108	308	1127	1620	1604	1570	6392
TamilNadu	529	38	312	69	65	377	348	439	2177
Uttar Pradesh	45	141		62	60	75	183	221	787
Uttaranchal	134	93	71	38	147	90	22	71	666
Sri Lanka	16				14				30
Total	9042	5744	19118	6448	11400	17656	16570	15238	101216



Training to farmers and extension personnel from abroad

General training on MIS as well as crop focused trainings are organised.

Such trainings have been imparted to agri-enthusiasts from Afghanistan, Pakistan, Sri Lanka, Nepal, Iraq, Jordan, Maldives, Mauritius, South Africa, Ethiopia, Sudan, Zimbabwe and Kyrgyzstan.

Some of the programmes were sponsored by FAO, USDA, Norwegian Church Authority (NCA), Japanese Govt. and IFDC.



The participants get a very wide spectrum of exposure, besides, class-room and practical training on designed modules. These include visit to R & D plots, laboratories, research facilities on renewable energy, tissue culture raised banana production technology, water harvesting, wasteland management, vermicomposting, fruit & vegetable cultivation and post-harvest technology.

Foreign training courses organized

Date Country	Participant of training	Location	Topic	Famers/officers participants	No. of
October 11-21, 2002	Sri Lanka	JHAI, Jalgaon	Modern irrigation techniques and high-tech agri practices	Officers	25
June 9-11, 2003	India	JHAI, Jalgaon	High-tech cultivation of banana	Farmers	70
October 7-18, 2004	Colombo	Ambagasdowa, Colombo	Green house cultivation of vegetables	Officers and lead farmers	18
2005- 2006 (one year)	Africa	Several towns in South Africa	Hi-tech agriculture	Teachers/ Students/ Parents	120
March 6-15, 2008	Afghanistan	JHAI, Jalgaon	Hitech agriculture	Agri Officers	15
May 8-22, 2008	Pakistan in Pakistan	Several towns	Micro irrigation and fertigation and farmers	Dept officers	400
June 16-25, 2008	Sril Lanka	JHAI, Jalgaon	Hi-tech agriculture	Officers	21
November 19-24, 2008	Pakistan	Several towns in Pakistan	Micro irrigation and fertigation	Farmers/ officers	280

Profile of Visitors to Jain Hi-Tech Agri Institute

Type of Visitors	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Farmers	9629	9042	5744	19118	6448	11386	17656	16570	15145	110738
Govt. Officials & Political leaders	533	991	1123	1794	2488	1023	1031	1252	825	11060
Dealers	72	80	782	232	695	428	692	1482	962	5425
Faculty / Staff	560	5379	3497	2730	5058	2563	4233	6166	1203	31389
Students	2198	1597	4839	8149	6275	7275	4153	5634	4098	44218
Special Business Invitees	1180	3746	1233	1878	1774	1595	1424	2233	3557	18620
General Public	3442	11288	12462	7216	15752	5089	5779	13499	7036	81563
Overseas Visitors	99	185	131	171	254	368	343	473	397	2421
Total	17713	32308	29811	41289	38744	29727	35311	47309	33223	305434



Collaborative Research MOUs with State Agricultural Universities

- JHAI is recognized by DSIR, D.S.T., Govt. of India as Research Center.
- JHAI has also been recognized as a center of excellence for agricultural training by international agencies like FAO, World Bank and USDA.
- For promoting agricultural research Jains have entered into Memorandum of Understanding with 25 State Agricultural Universities across the country and 2 International Institutes. This kind of public private partnership (PPP) for advancing research in agriculture has no parallel in India. The principal objectives are:
 - To foster academic-industry partnership to groom the students in focused areas of research as per the emerging needs of the country.
 - To share the available resources and manpower of the industry with the University/ Institute.





Post-graduate students from the Universities are invited to work at Jalgaon in our labs and R&D farms on topics of mutual interest. Scientists at JHAI are recognized as guides in different universities to supervise the students' research in close co-ordination with major guides from the universities.

Additionally, micro-irrigation systems are installed at the University campuses and Krishi Vigyan Kendras for demonstration and learning of students and technology transfer to farmers.



Collaborative Research MOUs with Universities

No.	University	Location	State
1	Allahabad Agricultural Institute	Allahabad	U P
2	Anand Agricultural University	Anand	Gujarat
3	ANGRAU	Hyderabad	A P
4	A P Horticultural University	Tadepalligudem (W. Godavari)	A P
5	Birsa Agricultural University	Ranchi	Jharkhand
6	CCS Haryana Agricultural University	Hissar	Haryana
7	CS Azad University of Agricultural & Technology	Kanpur	U P
8	Central Agricultural University	Imphal	Manipur
9	Devi Ahilya University	Indore*	M P
10	Dr. YS Parmar University of Agricultural & Forestry	Solan	H P
11	G B Pant University of Agriculture and Technology	Pantnagar	Uttarakhand
12	Junagadh Agricultural University	Junagadh	Gujarat
13	Maharana Pratap University of Agricultural & Tech.	Udaipur	Rajasthan
14	Mahatma Phule Krishi Vidyapeeth	Rahuri	Maharashtra
15	ND University of Agricultural & Technology	Faizabad	U P
16	Navsari Agricultural University	Navsari	Gujarat
17	North Maharashtra University	Jalgaon*	Maharashtra
18	Punjab Agricultural University	Ludhiana	Punjab
19	Rajendra Agricultural University,	Pusa	Bihar
20	Sardarkrushinagar- Dantiwada Agricultural University	Dantiwada	Gujarat
21	Sher-E-Kashmir University of Agricultural Science & Technology (K), Shalimar	Srinagar	J & K
22	Shri Keshwanand RAU	Bikaner	Rajasthan
23	Tamil Nadu Agricultural University	Coimbatore	Tamil Nadu
24	University of Agricultural Sciences	Bangalore	Karnataka
25	University of Agricultural Sciences	Dharwad	Karnataka
26	University of Agriculture Sciences	Raichur	Karnataka

*Traditional Universities

Collaborative Research MOUs with International Institutes

No.	Institute	Location	Country
1	International Crops Research Institute for Semi-Arid Tropics	Patancheru Hyderabad A P	India
2	International Rice Research Institute	Manila	Philippines

Ph.D. Thesis Completed = 6

1. Studies on influence of various nutrient levels applied through fertigation on growth, physiology, yield and quality of mango (*Mangifera indica* L.) cv. Ratna under high-density planting
2. Effect of drip fertigation on growth, yield and resource use in white onion (*Allium cepa* L.)
3. Effect of biofertilizers on banana cv. Grand Nain on growth and productivity
4. Studies on flowering behaviour, crop regulation and changes in physico-chemical properties of fruits during development, storage and processing of aonla (*Emblica officinalis* Gaertn.)
5. Genetic diversity analysis of some onion (*Allium cepa* L.) germ plasm lines
6. In vitro regeneration, microbulb production and haploid induction in some cultivars of *Allium cepa* L.





M.Tech./M.Sc. Ag. Thesis Completed = 10

1. Studies on sub-surface Irrigation on quality & yield attributes of Spinach (*Spinacia oleracea*)
2. Evaluation of sorghum varieties for ethanol production
3. Fertigation in onion
4. Biogas generation as an index of performance evaluation of various agro-industrial waste through an aerobic digestion
5. Performance evaluation of a sand filter of drip irrigation system
6. Assessment of local head losses in drip irrigation laterals
7. Development of a process for the production of pectin from mango peel
8. Studies on post-harvest technology of banana for export
9. Biogas generation from selected agro-industrial wastes
10. Evaluation of energy efficiency of Drip Irrigation as compared to conventional method of Irrigation: A case study of Banana (*Musa Sp.*) in Jalgaon district of Maharashtra

Ph.D. Research in Progress = 5

1. Diallel and molecular analysis of white onions (*Allium cepa* L.)
2. Microbial augmentation for improved production of biogas from fruit wastes
3. Studies on isolation & characterization of substrate specific microbes for enhancing biogas production
4. Micro-propagation and Transformation Protocol for the development of Transgenic Hill Banana
5. Monitoring and Characterization of Jatropha Mosaic Virus infecting *Jatropha curcas* L.

M.Tech. Research in Progress = 1

1. Evaluation of clogging mechanism in drip irrigation system

Agriculture Extension Activities

We have set up a large extension department. We participate in exhibitions, seminars, farmers' rallies, Farmers' meeting and Crop based campaigns etc. and take the concept to the door steps of farmers in rural areas. We also prepare booklets in various languages giving information regarding various aspects of micro-irrigation, irrigation scheduling, importance of filtration in micro-irrigation, blockage of drippers and acid/ chemical treatment, application of fertilizers through micro-irrigation system, etc. Crop-specific booklets, success stories/experiences of micro-irrigation system users etc. are also prepared & made available to farmers, bankers, agricultural departments and others. Different media like exhibitions, newspapers, periodicals, radio & TV are used extensively to carry out these promotional activities in different states in regional languages.

Demonstration on farmers' fields

In addition to the demonstration farm established by the company at Jain Hills, many micro-irrigation systems are supplied to farmers in different areas for different crops either free or at subsidized cost. Because of close monitoring and collaborative work carried out, these farms become good demonstration sites and farmers from nearby areas visit these farms and see the benefits of micro-irrigation system on a given crop. These farms also provide vital information / feedback which help the company to improve design, practices and products. These farmers also become JISL's spokesmen & spread word regarding the benefits of Jain micro-irrigation systems.

Seminars and Farmers' meetings

Seminars on drip irrigation, use of liquid, water soluble solid fertilizers, tissue culture (banana) for improvement in quality and increase in yield of various fruit and vegetable crops, cash crops such as cotton and sugar-cane are conducted in different districts of Maharashtra as well as in other states. Faculty members from the Universities, Senior government, Bank and Zilha Parishad officials also participate in these seminars. Village meetings are regularly organized to popularize the concept of drip irrigation, tissue culture banana, use of liquid and water soluble solid fertilizers and planting improved varieties of white onion and other crop varieties. During such meeting all doubts, queries asked by the farmers are answered by the team of agronomists.



Scientific Seminar/Conference: Our agronomists and engineers present technical papers on hi-tech agriculture and water management in conferences organized by different organizations both within the country and abroad.





Exhibitions

We participate in about fifty national and international exhibitions a year. Innovative and educative exhibits, posters and products displayed in these exhibitions are seen by a large number of farmers, entrepreneurs and officials also video films depicting technologies to improve agriculture are projected.



Publications

- A in-house Magazine, “BHUMIPUTRA” is published quarterly in Marathi covering highlights of various activities of company, current events, awards, glimpses of farmers' extension activities, visitor's profile and views, staff welfare, social, cultural and sports activities organized and sponsored by Jain Charities and Bhavarlal & Kantabai Jain Multipurpose Foundation.
- The company has published a number of leaflets, crop folders and booklets on drip irrigation, products and improved agro-techniques for different crops such as cotton, papaya, onion and banana in Marathi, Hindi and English. News paper articles highlighting the research results are published regularly. Success stories of those using drip irrigation, tissue culture banana and liquid fertilizers and case studies of progressive farmers also form part of the literature published by the company.





Jain High-Tech Agri Institute
R & D: Field and Lab



Thrust areas of Research

- Micro Irrigation (MIS & SIS)
- Tissue Culture
- Crop Improvement
- Medicinal plants
- Food Processing
- Vermi-composting and Organic manure
- Horticulture
- Agronomy
- Biotechnology
- Plant Protection
- Biogas

Research is being carried out on various crops such as Banana, Mango, Aonla, Pomegranate, Onion and Jatropha. Some noteworthy achievements are:

Field R&D: Company also carries out extensive field trials at JHAI. R & D activities are undertaken to develop irrigation schedules, drip design and agronomical practices to optimize high yields at optimum inputs. The findings are published from time-to-time and made available to farmers and interested public.

Watershed Management: Availability of water was a problem as this area receives scanty rainfall (av. 566 mm). Therefore, rainwater harvesting was planned and executed. Small collection ponds are constructed for effective harvesting of rain-water. In addition check bunds and trenches across slope along contour lines have been made.

Crop based Research

(I) Banana: Protocol for banana tissue culture cv."Grand Nain" standardized. The tissue culture lab is an ISO 9001:2000 certified production unit. The unit is also certified by BCIL (DBT).

- After field trials on irrigation, fertigation, crop geometry etc. recommendations are made to the farmers
- Trials on the use of bio-fertilizers, staggered plantations, and organic cultivation of banana have also been carried out for the benefit of farmers

Infrastructure for R & D

- A multicrop farm with modern technology inputs.
- Demonstration of land, water & soil management systems.
- Demonstration of micro-irrigation and fertigation systems and multiproduct display.
- Bio technology and bio fuel, and solar laboratories.
- Permanent experimental plots for major crops.
- A soil, water and chemical analytical laboratory.
- Well equipped food Microbiology, Pesticide Residue Analysis, biodiesel analysis, Plant virus testing labs.
- These labs are accredited by NABL (ISO/IEC17025: 2005)
- Transport and other logistical support.
- A well equipped Desk Top Publishing house.
- Helipad
- Eco structure supporting animal habitat & birds like peacocks etc.

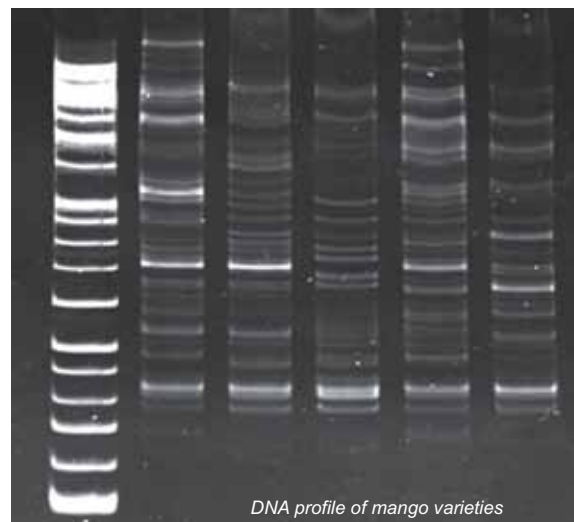
JHAI Library

Location	Books Cassettes/ CDs	Video/ Audio	Periodicals
Agri Park	3992	271	65
Food Park	2813	88	32
Plastic Park	6308	1302	80
Total	13113	1661	177



(ii) Mango: A collection of germplasm from various sources is maintained. It is used for chemical and molecular analyses for authentication of varieties and other useful traits.

- Agronomic practices for high density planting of mango, fertigation, bio-fertilizers, organic cultivation standardised.
- Trials on production of off-season fruits of mango by using chemicals such as Cultar (Paclobutrazol) are being carried out. This chemical is also being used to overcome alternate-bearing characteristics of some of the varieties.
- A major problem in ripe mango (Alphonso) fruits is spongy tissue. The causes for spongy tissue are investigated through biochemical approach.
- Identified a set of primers that permit us to authenticate six major varieties of mangos used for processing/IQF. SCAR primers are being developed on the basis of the RAPD fragments obtained using these primers.
- Studies on biochemical and molecular changes (gene expression patterns) during ripening of mango under natural and chemically induced ripening have been initiated.



(iii) Aonla: A collection of germplasm from various sources is maintained. It is used for chemical and molecular analyses for authentication of varieties and other useful traits.

- Biochemical studies on the development of fruit of different varieties has been carried out. These studies provide information on the pattern of accumulation of medicinally important components (polyphenols, tannins, vitamin C) of the fruit.





(iv) Pomegranate: A Germplasm collection of several varieties from different sources has been established for selection, adaptation and hybridization purposes.

- A micro-propagation protocol for pomegranates has been developed



(v) Onion: The company is processing over 75,000 MT of onions annually to produce different types of dehydrated onion products. To be competitive in the world, it was necessary to cultivate white onion varieties with high solids.

- Breeding programme has led to the selection of high solid containing onion varieties (20% solids).
- Developed agronomic practices including use of micro-irrigation and procedures for high quality seed production. Over 20 MT of onion seeds of varieties suitable for Kharif and Rabi seasons are produced.
- Molecular studies to identify molecular markers for breeding purposes and establishing the basis of male sterility are in progress.
- A protocol for the production of micro-propagation of onion was developed. To conserve and to produce nucleus material of onion, a protocol for producing micro-bulbs that can be stored for several months has also been developed.
- To advance the processing season, a method of sets planting that yield bulbs a month earlier than the bulbs from seeds has been evolved. The bulbs produced from sets planting have several other advantages.

(vi) Jatropha: Germplasm collection of over 300 accessions from different sources maintained. Selections have been made for high oil containing accessions and these are under trial for productivity potential.

- Attempts are being made to generate molecular markers for identifying accessions that have high oil yielding potential.
- Agronomic trials to determine crop geometry, pruning time and intensity, water requirement, nutritional requirements are underway.
- A major development in producing elite propagation material has been achieved through the development of a commercial tissue culture protocol. A few hundred TC plants are in the field & their fidelity for oil content through molecular analysis has been done.



Several aspects of Jatropha oil seed processing including bio-diesel production from Jatropha oil are being carried out. To improve the economic viability of Jatropha seeds, as a bio-diesel crop, value addition and by-product utilization through the use of oil cake for biogas production and enriched organic manure have been completed.

Vermi-compost: The vegetable/ fruit processing waste is utilized for vermi-composting. 100 vermi-compost sheds have been erected which also serves a live demo for training.

Other farm related activities

D.R. Mehta Gomata Ashram: A gaushala (cattle shed) consisting of about 300 cattle (cows, buffaloes, bullocks) is maintained. The cattle dung is utilized for bio-gas plants and partially serves as an inoculum for expeditious composting of agri waste and vegetable/ fruits processing waste.

The cattle urine is partially utilized as foliage nutrient & bio-pesticide, while the balance is utilized for enriching organic manure.





Jain R&D Laboratory

The Group has in-house Research & Development laboratory, which is recognized by the Department of Scientific & Industrial Research (DSIR), Department of Science & Technology (DST), Govt. of India, New Delhi since 1981. The laboratory carries out tests, calibrations, scientific & applied research to meet customer requirements and supports continual growth of industry.

Support Facilities: Well furnished laboratory rooms for testing of various equipments.

- Controlled environment conditions like temperature, humidity and light for testing.
- Laboratory is provided with all necessary equipments required for testing and calibration.
- Adequate technical manpower for managing and conducting various tests.
- Laboratory is provided with supporting services like internet, local area network, telephone, DG sets, air conditioning, fire services, water supply and maintenance.



One learns Agriculture by practicing it; and JHAI assists its stakeholders in internalizing this principle.

The Research & Development laboratory has been accredited by the National Accreditation Board for Testing & Calibration Laboratories (NABL) in accordance with ISO/IEC 17025:2005. Jain R&D Lab is the first in the country to get approval from NABL for Bio-diesel Testing & Plant Virus Indexing (Banana Tissue Culture). It also holds accreditation for Food Chemistry, Chemical General, Microbiological Testing and Sensory Analysis.



Testing Facilities

Pesticide Residue and Heavy Metal Analysis: One of the few laboratories qualified to test Pesticide Residue in processed foods (puree and concentrate). We are presently testing 91 pesticide compounds conforming to EU, USA, UK and Japanese standards. Heavy metals such as lead, arsenic, cadmium, etc. are also analyzed.

Soil, Water and Plant Analysis: Samples of soil and plants are analyzed for different major and minor elements. Water is analyzed to test suitability for drinking and irrigation purpose.

Biodiesel Analysis: Extraction of oil, transesterification of oil and separation of glycerin are the activities associated with biodiesel manufacture. Various parameters for oil and biodiesel viz. percent crude oil from the seeds, acid value, peroxide value, cetane number, cloud point, pour point, flash point, etc. are routinely analyzed.

Biological Testing: Fresh and processed fruits and vegetables are tested for total viable count, yeast, moulds, fungi and bacteria as per USFDA, Bacteriological Analytical Manual and other International Standards. Major parameters that are covered include TVC, Coliform, Enterobacteriaceae, E.coli, Bacillus cereus, Faecal streptococci, Staphylococcus aureus, Sulphite Reducing anaerobes, Listeria monocytogenes, Y.M, Mesophilic aerobic and anaerobic spore formers, Thermophilic spore count, Flat sours, Salmonella, Lactic acid bacteria, Clostridium perfringens, heat resistant mould, TAB, HMC etc.

Chemical analysis of fresh and processed fruits & vegetables: Analysis for proximate constituents of fresh and processed fruits and vegetables such as mango, banana, pomegranate, aonla and onion is carried out using standard methods of analysis.

The parameters include pH, total soluble solids, acidity, total sugars, reducing sugars, total polyphenols, tannins, vitamin C, total proteins, total fat, crude fiber, moisture, ash, etc. and estimation of pungency for fresh and dehydrated onion.

Organoleptic test of processed fruit samples: This is done by tasting the products so as to determine its suitability for their end use, i.e. in juice/nectars. We have a panel of experts comprising of 17 persons trained at CFTRI, Mysore for routinely carrying out these tests.



Banana Viruses Indexing: Mother suckers/explants used for initiation of Banana tissue culture and tissue cultured plants are screened for the presence/absence of major viruses affecting banana viz. banana bunchy top virus (BBTV), banana streak virus (BSV) and banana mosaic caused by CMV.

Calibration Calibration of mechanical, thermal and electro-technical discipline equipments and instruments are carried out.

Technology and Development: Jain R&D has its own research and development wing with experienced scientists and technicians to take up innovative technologies and develop its own techniques. It uses validated & published methods of analysis recommended internationally by AOAC, ADOGA, APHA, NMKL, USFDABAM, ISO & IS.IFU. Whenever any new product or parameter is required to be analyzed, research wing evaluates and modifies, if required, available methods or develops new methods for analysis.



Renewable Energy

Biogas: R&D for higher biogas production for replacement of electricity, petro-fuel is underway. Also we are experimenting with industrial/agro-waste for evolving suitable substrates and efficient methanogenic strains of microbes.

A unique power project of 1.7 MW capacity based on our fruit waste is under construction along with an automated composting process to treat various types of wastes. This power plant will also generate steam/hot water from waste heat recovery system which can be used for our process applications.



Solar: Solar water heating systems, both with flat plate collector and evacuated tube type are manufactured and supplied in natural thermosyphon and forced circulation type. Specially designed systems suitable for typical process applications using PLC controller are also available. Concentrating collectors are being developed for high temperature applications.

Other Solar photo voltaic applications include Home lighting, Lantern, Street lighting, traffic signal, blinkers, road stud, fencing and Solar powered Drip & Pumping Systems. A manufacturing set up available for Solar modules installed with capacity enhancement upto 30 MW.



Faculty for Training, R&D and Extension Services

Agricultural Science			
No.	Name	Qualification	Experience (yrs.)
1	Dr. P. V. Sane	Ph D ex Director, NBRI, Lucknow	51
2	Shri. U. B. Pandey	M Sc Ag (Horticulture), ex Director, NHRDF, Nashik	44
3	Dr. Ashok Mishra	Ph D (Plant Pathology), ex Dean (Agri), JAU, Junagadh	40
4	Shri. V. B. Patil	M Sc Ag (Entomology), ex Scientist, MPKV, Rahuri	39
5	Dr. V. R. Bala	Ph D (Horticulture), ex Principal Scientist, NBRI, Lucknow	37
6	Dr. J. P. Sahu	Ph D (Agronomy), ex Prof., GBPUA & T, Pantnagar	34
7	Dr. P. Soman	Ph D (Agri), ex Principal Scientist ICRISAT, Hyderabad	30
8	Shri. B. D. Jade	M Sc Ag (Soil Science)	25
9	Dr. A. V. Dhake	Ph D (Soil Science)	21
10	Dr. S. R. Vasane	Ph D (Biotechnology)	16
11	Shri. K. B. Patil	M Sc Ag (Horticulture)	15
12	Dr. V. R. Subramaniam	Ph D (Entomology)	15
13	Dr. Anil Patil	Ph D (Biotechnology)	15
14	Shri. Shriram Patil	B Sc(Horticulture)	14
15	Dr. S. Bhardwaj	Ph D (Micro)	11
16	Dr. Akhilesh Mishra	Ph D (Botany)	09
17	Dr. Balkrishna	Ph D (Horticulture)	07
Engineering			
1	Shri. J. J. Kulkarni	DME	46
2	Shri. L. H. Sharma	MBA (Mktg), BSc (Chemistry)Hons	33
3	Shri. P. H. Choudhari	ME (Structures)	28
4	Shri. M. B. Reddy	BE Ag	27
5	Shri. S. P. Jadhav	B Tech (Agriculture Engineering)	24
6	Dr. S. B. Dugad	Ph D (Water Resources Engg.)	24
7	Shri. D. H. Yewalekar	DCE	23
8	Shri. R. G. Patil	DME	22
9	Shri. P. M. Masne	B Tech (Agriculture Engineering)	21
10	Shri. S. Phadnis	BE DCM	19
11	Shri. Viqar Khan	ITI	17
12	Dr. Madhusudan D.	Ph D (Civil Engineering)	16
13	Shri. Abhijit Joshi	M Tech (Water Resources Engg.)	12
14	Shri. R. Kolhe	M Tech (Agriculture Engineering)	11
15	Dr. Santosh Deshmukh	Ph D (Water Management)	05
16	Shri. D. C. Gokhale	ME (Electronics)	05
Post Harvest, Processing & Quality			
1	Dr. D. N. Kulkarni	Ph D (Food Technology), ex Dean(FT), MAU, Parbhani	35
2	Dr. Karuna Kulkarni	Ph D (Food Technology), ex Prof. (FT), MAU, Parbhani	35
3	Shri. S. D. Jain	M Sc	26
4	Shri. S. D. Gupta	M Sc	18
Humanities, Behavioural Science, Marketing & others			
1	Shri. D. M. Desai	B Sc (Hon's)	32
2	Shri. P. S. Naik	M Com, MPM	23
3	Shri. G. I. Desarada	HSC	20
4	Shri. R. H. Kakde	M Sc	21
5	Shri. V. M. Bhat	MPM	19
6	Shri. V. N. Rapatwar	B Com, MCM & Journalism	16

Faculty for Extension Services across India

No.	Name	Place	State
1	A. Ravichandra Reddy	Kurnool	A.P.
2	Balu T. Shinde	Solapur	M.S.
3	Bohra Narendra Kumar	Jodhpur	Rajasthan
4	Chaudhari Mohan	Jalgaon	M.S.
5	C. P. Singh	Kullu	H.P.
6	Dharampal Patil	Sangareddy, Medak dist	A.P.
7	Dhiraj Singh	Banaskantha	Gujarat
8	Dr. A.N. Tiwari	Gorakhpur	U.P.
9	Dr. Manish Sharma	Baroda	Gujarat
10	Dr. Mukesh Chahar	Jaipur	Rajasthan
11	Dr. Nagendra Gyani	Kinnor	H.P.
12	Dr. Pankaj Kumar	Solan	H.P.
13	Dr. Sunder Singh	Udmalpeth	T.N.
14	G.G.Garasangi	Gulbarga	K.K.
15	G.N. Thiruselvam	Erode	T.N.
16	G.Rama Rao	(Chittoor) Cont. farming	A.P.
17	Girish Halappa	Plastic Park	H.Q.
18	Gopal krishnan	Salem	T.N.
19	Gopikrishnan	Erode	T.N.
20	Hanumantha Reddy	Rajamundry E.G.	A.P.
21	Ingawale Umesh Hemant	Nasik	M.S.
22	Jadhav Tushar	Pune	M.S.
23	Jain Praveen Kumar	Palampur	H.P.
24	Jha Sanjeev	Raipur	C.G.
25	Joshi C.A.	Mudhol	K. K.
26	Kadam Govind Ganaptrao	Jalgaon	M.S.
27	Lakhman Dodia	Bardoli-Surat	Gujarat
28	Lakshmanan	Vellore	T.N.
29	M.S.Prasad	Hyderabad	A.P.
30	Malhotra Parikha	Sundernagar	H.P.
31	Manoj Kumar Singh	Ranchi/Bihar	Jharkhand
32	Menon Sandeep	Rampur	H.P.
33	Milind Deshmukh	Amaravati	M.S.
34	Mirza Shafiulla Baig	Warangal & Khammam	A.P.
35	Ms. S. Saranya	Tiruneveli	T.N.
36	Murli Ayyar	Malwa - Indore	M.P.
37	Narayan Y. Pawase	Nanded	M.S.
38	NRK Moorthy	Karimnagar	A.P.
39	Pankaj Patil	Varna	M.S.
40	Patel Sadulbhai	Kutch - Nakhtrana	Gujarat
41	Patel Yogesh	Baroda	Gujarat
42	Patil Govind	Nandurbar	M.S.
43	Patil Kiran	Pandharpur	M.S.
44	Patil Manohar	Ahmednagar	M.S.
45	Pattani Vishal Jayantilal	Visnagar- Mehsana	Gujarat
46	Poornachandar Mohan	LIMIP	A.P.
47	Prabhakar yelwar	Bijapur	K.K.
48	Purushotham Reddy	Nalgonda	A.P.
49	R. Sudheendra	Hubli	K.K.
50	R. Velmurugan	Theni	T.N.
51	Rajendra Kirloskar	Pune	M.S.
52	Ram Pratap Choudhary	Bikaner	Rajasthan
53	Saini Kiran Kumar	Bhatinda	Punjab
54	Sandhu Shivtej Singh	Ludhiana	Punjab
55	Sengar Narendra Singh	Dhamnod	M.P.
56	Sharma Prashant	Anoopgarh	Rajasthan
57	Shravan Kumar	Hosiarpur	Punjab
58	Stephen Arul	Udmalpeth	T.N.
59	Suresh Magdum	Sangli	M.S.
60	Tripathi Y.N.	Plastic Park	H.Q.
61	Veera Prasad	Cuddapah - APMIP	A.P.
62	Vellaia Swamy	Chittoor Cont.farming	A.P.
63	Vijendar Kumar	Sangareddy, Medak dist.	A.P.
64	Zakeer Hussain	LIMIP	A.P.
65	Arie Peleg	Consultant	H.P.

Awards offered by Jain Irrigation Systems Ltd. and its Charitable Arms

Recognition of outstanding work in the field of agriculture, education, social, art and literature is done through institution of awards and awareness programmes

No.	Title of the Award	Nature	Convener	Field
Sponsor: Jain Irrigation				
01	* Jain INCID Micro Irrigation Award	Rs. 51,000	INCID and Jain Charities	Micro Irrigation
02	* Jain-INCID Agri Irrigation Award	Rs. 51,000	INCID and Jain Charities	Agri Irrigation
03	* Padmashree Late Dr. Appasaheb Pawar Modern Agri. Hi-Tech Award	Rs. 1,00,000	Jain Charities	Hi-Tech Agri.
04	* Best Banana Producer Award	Rs. 5,100	Jain Charities	Banana Yield
05	* Banana Lifetime Achievement Award	Rs. 51,000	Jain Charities	Lifetime Work on Banana
06	*Late Kantabai Jain White Onion New Technology Award	Rs. 11,000	Jain Charities	Modern Agricultural Technology
07	* Watershed Development Award	Rs. 25,000	Maharashtra Watershed Development Centre, Pune	Development
08	* Jain Nedungadu Agri Engineering Award	Interest on Rs. 10,000	Jain Charities	Soil Conservation
09	* Godavari Drawing and Sculpture Award	Interest on Rs. 2,00,000	Kusumagraj Pratishthan	Fine Arts
Sponsor: Bhavarlal and Kantabai Jain Multipurpose Foundation				
01	* Jamnaben Social Work Award	Rs. 51,000	Mah. Go-Vidnyan Samiti	Gandhian Philosophy
02	* Rural Poetess Bahinai Award	Rs. 51,000	Jain Charities	Rural Poetry
03	* Nature Poet Balkavi Thombre Award	Rs. 25,000	Jain Charities	New Generation Poet
04	* Rural Poet Mahanor Award	Rs. 51,000	Jain Charities	Rural Literature
05	*Popular Leader Yashwant Chavan Literature Award	Rs. 11,000	Marathwada Sahitya Parishad, Aurangabad	Literature
06	Dramatician Lotubhai Patil Drama Award	Rs. 11,000	Marathwada Sahitya Parishad, Aurangabad	Drama
07	* Gaurabai Hi-Tech Banana Award	Rs. 51,000	Jain Irrigation	Hi-Tech Banana
08	Gauri Gold Medal	Gold Medal	North Mah. University	Educational
09	Hira Gold Medal	Gold Medal	North Mah. University	Educational
10	Ranidanji Gold Medal	Gold Medal	North Mah. University	Educational
11	Nathibai Gold Medal	Gold Medal	North Mah. University	Educational
12	Kantabai Gold Medal	Gold Medal	North Mah. University	Educational
13	*Hiralalji Jain Fellowship	Interest on Rs. 50,000	ICRA Educational Institute	Educational
14	• Hiralalji Jain Talent Award	Interest on Rs. 25,000	R. R. High School	Educational

* With shawl, coconut, citation and/or trophy.

• With a set of good books/encyclopedia.

Location

Jain Hi-Tech Agri Institute (JHAI) is located at the picturesque Jain Hills on the Shirsole Road, 7 km away from Jalgaon city.

Jalgaon is a District headquarter in North West Maharashtra, bounded by Satpura mountain ranges in the north and Ajanta mountain ranges in the south. The city has a population of about 5 lacs.

Major crops grown in the district are banana (16% of India's banana cultivation is from Jalgaon District), cotton, jowar and pulses.

Jalgaon is a major rail Junction while Bhusawal, 28 kms away, is a major divisional headquarter of Central Railway. Jalgaon is well connected to Mumbai, New Delhi, Kolkata, Chennai, Bangalore, Ahmedabad and Pune. The nearest airport Aurangabad is 150 km away.

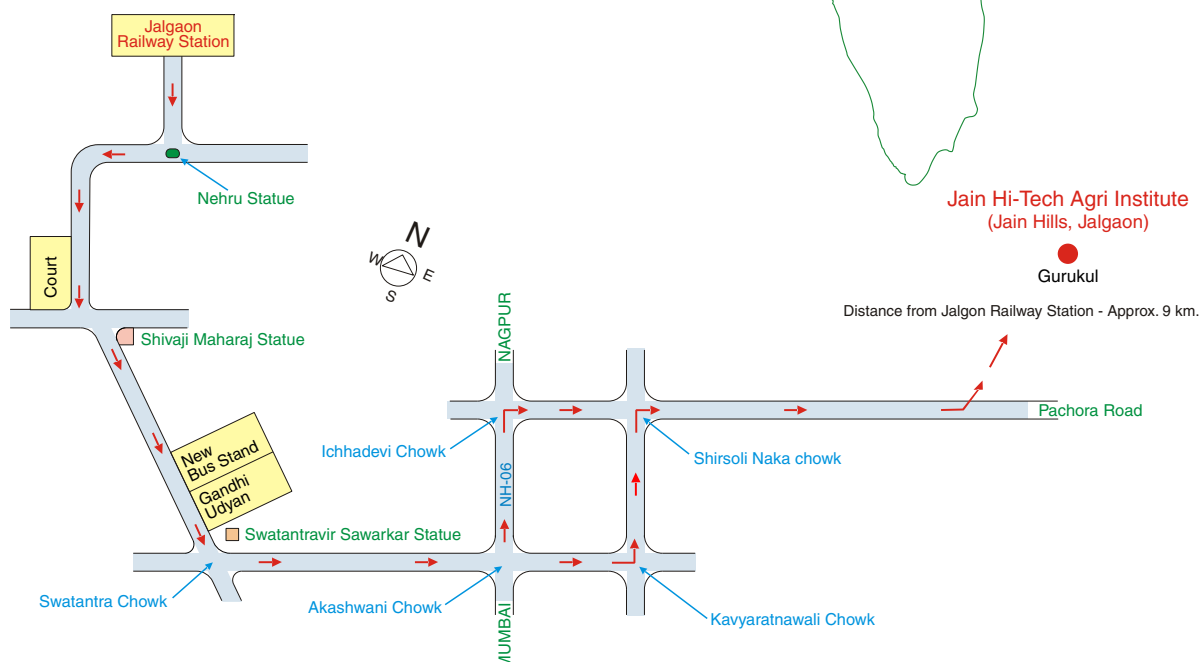
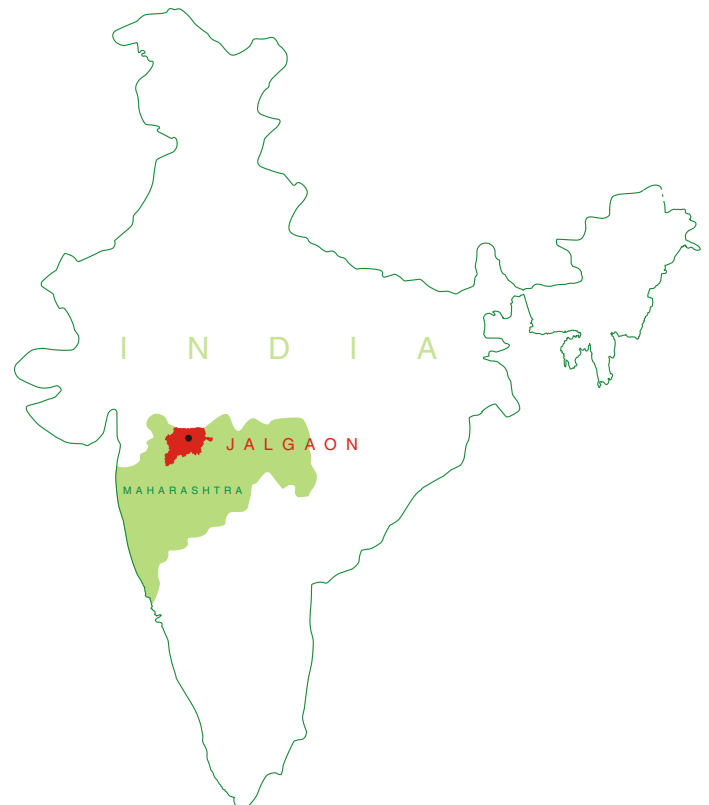
The world famous Ajanta caves, a world heritage site is approximately 50 km away while Ellora caves are approximately 150 km away. Jalgaon as a industrial city was brought to prominence by Jain Irrigation Systems Ltd.

Jain Irrigation - a diversified entity with more than 7, 000 associates and a product portfolio encompassing irrigation products, piping products, plastic sheets, dehydrated foods, fruit puree and juice concentrate.

Jain Irrigation has pioneered drip irrigation for small farmers in India. It is the second largest drip irrigation company in the world with a major market share in one of the fastest growing markets.

JISL took the lead in pioneering and popularizing the concept of micro irrigation system for small farmers in India in 1986.

Padmashree Dr. Bhavarlal Jain, the visionary founder Chairman is of the firm opinion that no other sector's progress, howsoever phenomenal, can substitute the development of agriculture.



There is more to Jain Irrigation than irrigation



Jain Irrigation Systems Ltd is a diversified entity with a turnover in excess of 3000 crores. Jains have a Global presence with 20 manufacturing bases spread over 5 continents. Our products are supplied to 110 countries with able assistance from 3000 Dealers and distributors worldwide.

Jain irrigation is the 2nd largest Micro-Irrigation company in the world. The Micro-irrigation Division manufactures full range of precision-irrigation products; provides services from soil survey, engineering design to agronomic support; nurtures two sprawling 1500 acre R&D and technology demonstration farms and a Hi-Tech Agri Institute houses a full-fledged Training & Extension Centre & undertakes turnkey projects for agricultural and irrigation development in total. Over 1000 agri and irrigation scientists, Engineers, technologists and technicians are engaged in offering consultancy for complete or partial project planning and implementation like Watershed Development through Wasteland Transformation, including crop selection and rotation.

We are also the largest Plastic pipe manufacturer in India covering a wide range of pipes and fittings. We annually process over 200,000 MT of various polymers. We extrude and injection mold PVC, PE, PP along with other engineering polymers like Polycarbonate, Polyamide, PBT, ABS etc. We are a Total Solution Provider' for various thermoplastic Piping systems that are used in transportation/ conveyance of water & other fluids, semi-solids, gases and cables.

The Tissue Culture Division produces Grande Naine Banana plantlets and has established matching primary and secondary hardening facilities as well as independent R&D and virology labs for pre & post production quality control. Similarly a modern Bio-tech

lab equipped with PCR based and other molecular markers, HPLC, AAS & GC, has been established to meet the needs of continuous genetic improvement and validation programme in cultivation of onion, banana, mango and some of the energy crops.

We process tropical fruits into purees, concentrates, juices and IQF products. The Dehydration Facility dehydrates Onions & Vegetables. The Spray Drying Unit processes gooseberry and other fruit purees into powders.

Agricultural and Fruit Processing waste is converted into organic manure. Plant-based pesticides are also formulated. Both are critical inputs for organic farming, a sustainable system that we profess and practice.

Jain Irrigation is a Total Agri-Solution provider from end to end; concept to commissioning. It is through such multi-dimensional activity profile that we nurture the complete agri value chain and have become a 'one-stop hi-tech agri shop'. The reward has been over a million satisfied farmers and scores of happy customers globally.

Our other businesses include PVC and Polycarbonate sheets, Solar Water Heaters and Solar Lighting etc where the emphasis is on the conservation of scarce natural resources like forest and energy. In the alternative energy space, we are moving into solar pumps and hybrid (solar cum wind energy) systems.

Our unflinching efforts in pursuit of excellence appropriately blended with ongoing Research and Development work have earned the company highest R&D awards of the country and numerous other awards and recognition for our performance in Exports, Fair Business Practices, Quality Excellence etc.

A lifetime commitment to introduce modern yet affordable and viable technologies in all our product offerings have compelled us to be perpetually creative and innovative.

