

NEW



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THE WORLD'S LEADING PUBLICATION ON HIGH TECH AGRICULTURE

Heard and Seen at the New Ag Conference in New Delhi:

Latest Products and Trends in Plant Nutrition, Irrigation, Fertigation and Biological Plant Protection

**High Tech Ag
developments in Asia:**

**Focus on India, South China
and Pakistan**



Leaders Profile

Brandt (USA)

Welcome to the ISHS symposium on Hydroponics in Lima, Peru

Jain Irrigation buys Thomas Machines

Jain Irrigation has recently acquired a controlling stake (69.75%) in Switzerland-based Thomas Machines S.A. Thomas Machines is a manufacturer of specialist machines and equipment including drip irrigation lines, quality control and testing equipment, automation equipment, laser machine centres and laser products. The acquisition will help Jain Irrigation invest in the field of irrigation to build capacities and increase speed-to-market for new generation drip lines including precision irrigation products.

Thomas Machines holds valuable IPRs and cutting-edge technology in both irrigation and composite pipes business. Ajit Jain, joint managing Director, Jain Irrigation Systems, said: "We are excited about the potential of Thomas Machines to contribute in the growth of our drip division. We have not only secured technology for its significant and growing division but now we are a step ahead of all our competition in terms of quality of products. This will further help to consolidate JISL's leadership position in the industry worldwide."

Big troubles ahead with fewer pesticides?

Leading European agricultural experts gathered to express their fear that reducing the available range of pesticides could lower their efficiency and that it is likely resistance will increase. The scientist's concern is triggered by proposals announced by EU institutions to reform legislation on plant protection products. The European Parliament voted in favor of new legislation which would drastically reduce the number of authorized pesticides, in the coming years. In the "Declaration of Ljubljana", participating scientists conclude that the increased risk of developing resistance to the few remaining substances could make the cultivation of many crops, including grapes, wheat, barley, cotton, fresh fruit, potatoes and vegetables, in Europe problematic, and or uncompetitive. The scientists' spokesperson, Ian Denholm, Head, Plant and Invertebrate Ecology Division,

Rothamsted Research, UK pointed out that, "In order to safeguard the production of food at affordable prices, it is essential to provide farmers with access to sufficient diversity of crop protection solutions. This is essential to prevent or delay the development of resistant pests, and to maintain the efficacy of remaining crop protection products." European Union legislation has already resulted in a reduction of the available portfolio of pesticides by more than 55% over the last decade. From a resistance management point of view, the crop protection products portfolio in Europe has already been very seriously impaired by the ongoing EU re-registration process, under Directive 91/414/EEC. Of the 952 existing crop protection products that existed previously, 530 have already been eliminated - and a further significant reduction in compounds is to be expected.




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Growing Success and Interest for Drip-Fertigation of Sugarcane



Dr P. Soman

India is world's largest producer of sugar. But the average cane productivity is only 72.6 t/ha.

In order to reduce the cost of production of cane, an important contributing factor is the enforcement of more precision in the input use and crop management.

This is the main reason why there is a growing acceptance of the drip fertigation technology by sugarcane farmers, as superbly highlighted by Dr. P. Soman, Vice President (Technical), Jain Irrigation systems Ltd. in his New Delhi lecture.

Sugarcane crop is considered as a high water user- by virtue of very high biomass production and long duration (11-13 months). Amongst the various factors contributing to lower yields are input management methods-irrigation and fertilizer application- both of which can be improved by adoption of drip irrigation technology. Among other factors, doing away with the conventional spacing of 0.75 m or 0.90 m row spacing and introducing alternative plant spacings and geometry were found to result in higher yields. These spacings are introduced to suit mechanization including drip line placement (cost optimization).

In India, sugarcane is now planted in Paired rows (0.75 x 1.2 x 0.75 m or variations of this basic spacing) or wide row (1.5 m ridges and furrow) or in widely spaced pits (1.5 x 1.5 m).

IMPROVED FERTILIZER MANAGEMENT THROUGH FERTIGATION

Conventionally all the fertilizer is applied at planting or to a maximum crop growth period of 90 days. The

physical difficulty in accessing crop rows and clumps to place fertilizers at advanced growth stages. The growth duration is long - 11 to 15 months.

Prolonging the availability of nutrients at various proportions during the entire growth period and make the different nutrients to work for producing high quality (high sugar) and high yield is an interesting challenge indeed. Sugarcane is therefore one of the ideal crops for practicing fertigation technology.

Sugar mills across the country uses various fertilizer recommendations for cane crop based on local research or institutional recommendations. The application schedule also varies across locations. However, in almost all the cases fertilizers are given only during first 90 or 120 days of growth.

It is necessarily understood that to provide a scientific basis for the schedule of fertigation- a lot of location specific research has to be carried out and nutrient uptake calendars have to be worked out. However, the empirical scheduling that is followed as per the growth stages and duration (table 1). In table 2, Dr Soman gives fertigation schedules in application in a number of the sugarcane commands.

For the correct nutrition schedule of sugarcane, knowledge of its growth

physiology is essential. There is an initial phase of slow growth of about 6-7 months followed by a fast rate which lasts for another 6-7 months. In the second phase about 75% of dry matter is accumulated. Therefore the nutrient supply should take care of this important issue. Interestingly, in the conventional cultivation practices last split of fertilizer is given before the completion of first six months leaving the rapid growth phase to depend on soil reserves and stored nutrients in the plant. The difficulty in actually placing fertilizer in the row while banding the fertilizer in tall and close crop is one factor forcing the cultivator to complete the fertilizer application before 6 months.

RATOON MANAGEMENT AND LAYING OF DRIP LINE

Ratooning of cane is very essential for increasing the benefit to the farmer. Proper management of ratoon crop is necessary. In India the potential of Ratoon crop is always under estimated hence yield of ratoon is low. Drip lines rolled and kept by the side of the field are to be relaid with necessary maintenance to the lines before operating the system.

After harvesting the trash is collected and spread in furrows. Then stubble shaving is completed. The inter-furrow spacing should receive

Table 1: Sugarcane growth stages and durations

October-November Planting	January-February Planting	
	Weeks	Weeks
Growth Stage		
Germination	4-5	4-5
Tillering	5-11	6-10
Internode formation	12-16	11-14
Grand Growth	17-38	15-30
Sugar accumulation	38-41	30-32
Maturity to harvest	42-62	33-52

one deep cultivation to improve the soil physical condition & also to prune the stubble roots. The basal fertilizer dose is applied as per the recommendation. Drip irrigation is commenced immediately. Initially operate the system for 8-10 hours to bring soil at field capacity. For gap filling in ratoon crop poly-bag nursery should be raised with single eyed set and transplanting should be carried out in field after 45-50

days for maintaining optimum plant population.

A QUICKLY ADOPTED TECHNOLOGY

In the case of sugarcane unlike other crops, the adoption is easier wherever the sugar-mills are involved in the spread of drip irrigation to their respective commands. Whenever the cane departments and the managements of Sugar-mills respond to the challenge and take up the extension hand in hand with the drip

companies; the spread of the technology and extension took a rapid course. Of the total adoption figures sugarcane takes a good share of the area in States like; Maharashtra (20,000 ha), Tamil Nadu (10,000 ha), Gujarat (3000 ha), Andhra Pradesh (2000 ha). However, these figures form only less than 10 % of total sugarcane area in the country. A lot more needs to be done to make an impact in the total water use in sugarcane agriculture.

gy. This is the most critical factor that helped the company in extending this technology to large areas in several states.

For successful implementation of the technology, a large number of service components –land survey, water and soil analysis, study of climate data, system design, installation, system service and farmer training – are to be integrated as one composite package. This is an important factor that is leading to the rapid rate of adoption.

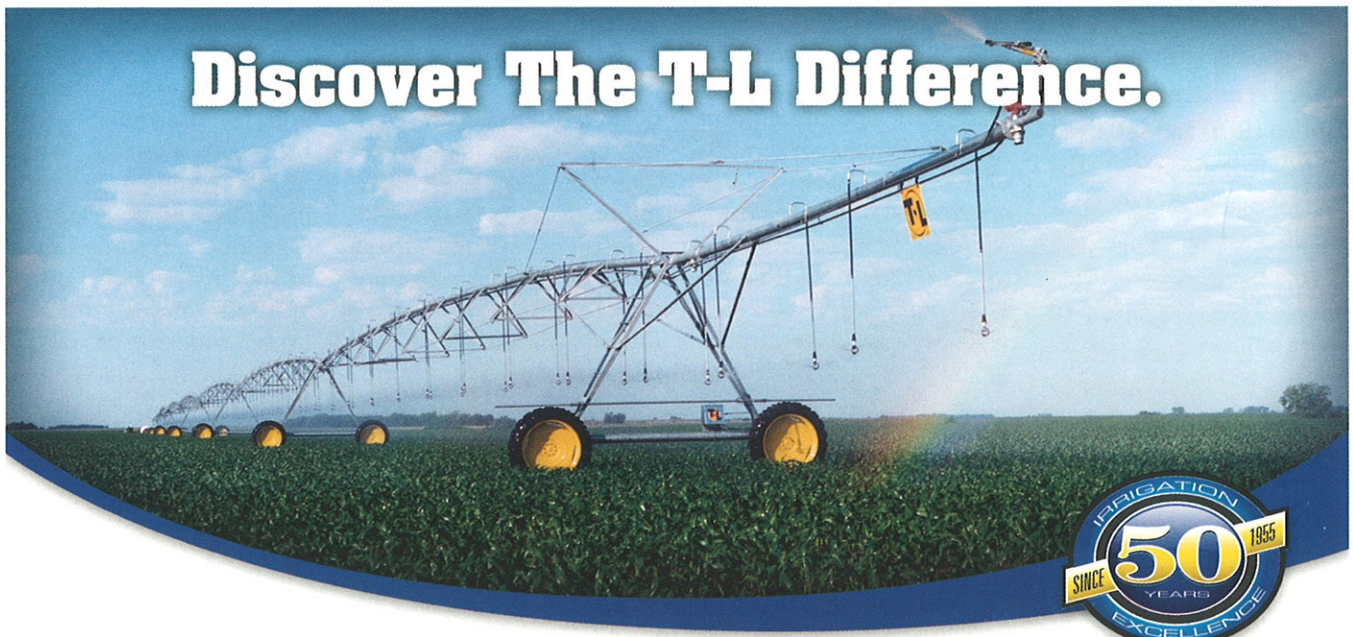
In the long run, Dr Soman believes that Indian farmers will get accustomed to use water with the same seriousness as when they use prescribed drugs. Thus we get into the phrase of “more crop per drop”, the baseline signature of Jain promotion campaigns. ■

Table 2: An example of fertigation schedule with water soluble fertilizers in Maharashtra

NUTRIENT REQUIREMENT 100:45:45 kg/acre			
Duration of Fertigation	Fertilizer grade	Total Fert Quantity kg/acre	Fertigation Schedule kg/day/acre
15 DAG to 60 DAG	19:19:19	50	1.1
Urea		76	1.7
61DAG to 170 DAG	19:19:19	68	0.62
12:61:00		36	0.33
Urea		75	0.68
171 DAG to 250 DAG	13:00:46	55	0.69

THE INTEGRATED APPROACH BY JAIN IRRIGATION

With the technical information and quality components as well as a thorough knowledge of Indian farming characteristics, Jains have evolved an integrated approach for the execution of microirrigation technolo-



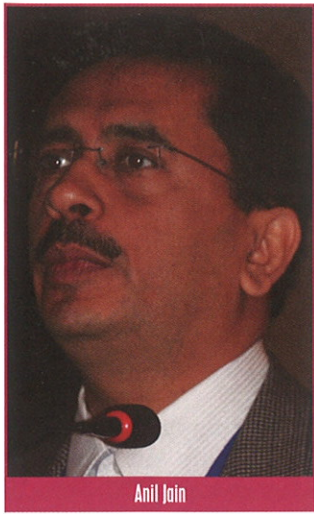
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The Irrigation Industry and Markets in India: Tremendous Developme



Anil Jain

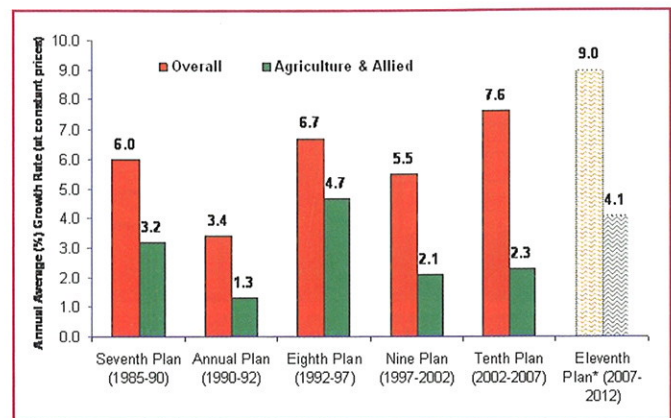
Courtesy of M. Larson

Agriculture may represent "only" 19.9% of the Indian GDP. Still its importance goes well beyond! The number of farms is 106 million. However the average size (1.5 ha/farm) is a considerable hindrance to the development and implementation of a number of modern technologies.

The famous Green Revolution of 1960s resulted in productivity gains with irrigation facilities, use of pesticides, fertilizers and HYV seeds. However the gains could not be sustained over the years. Actually, crop yields, farm incomes, cropped area, irrigated area are all either stagnant or have dropped down during last decade. Urgent measures are required to sustain the food requirements of a large population and economic well-being of the farming community.

A NUMBER OF REQUIREMENTS FOR A SUCCESSFUL PROMOTION OF MODERN IRRIGATION METHODS

The government support for promotion of drip & sprinkler irrigation is substantial: The Central government funds the states upto 40% of initial system cost and state governments provide additional 10% to 30%. Still it will not suffice to get the needed progress going! Mr Jain lists seven other requisites for this to happen: (1) enabling farmers to achieve yield/income gains through transfer of knowledge; (2) demonstrate to governments the savings



80 million hectares of irrigated area, i.e. 25% of the world irrigated area.

An ultimate irrigation potential of 140 million hectares and a Government that heavily supports the realization of this potential by granting subsidies:

Central and State Governments together subsidize 50% to 70% of initial cost for drip and microsprinklers; Rs 3000 Crores (750 Million USD) are proposed for 2007-12

(XI Five Year Plan). This should translate in an additional 1.5 Million ha of

Drip and 1 Million ha of Sprinkler during 2007-12 and in almost 2 billion US\$ of business for the irrigation industry during the same period! Those and other figures and trends were superbly highlighted by

Anil Jains, Managing Director of Jain Irrigation Systems, in his keynote lecture at the opening session of the New Ag conference in New Delhi.

in water & electricity with micro irrigation; (3) an effective distribution network for supporting the innumerable small farmers; (4) the emergence of trained manpower to support the distribution network and knowledge transfer; (5) awareness creation targeting farmers through campaigns especially by governmental agencies; (6) a total system approach – bundling of system hardware with support services; (7) an integrated approach—farm input (hardware & software) supply, buy-back & process.

AND A NUMBER OF POSITIVE TRENDS

Anil Jains identifies a number of trends in the market. To start with, there are crop & geographical trends: there is a growing acceptance of the interest for microirrigation in vegetable, cotton, sugarcane, oil seeds & other field crops. The

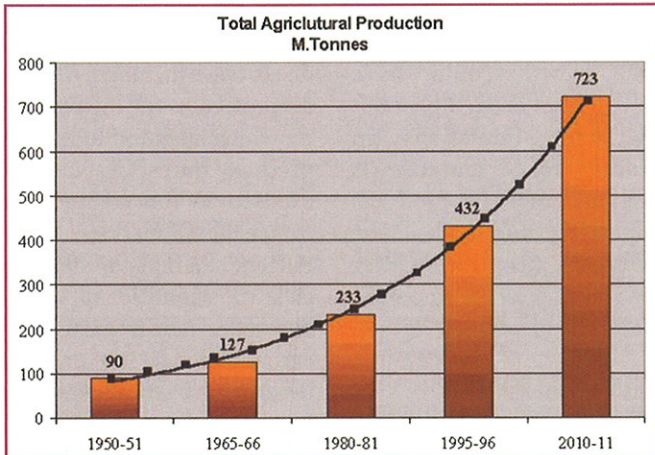
adoption is also growing in areas irrigated under canal, tank and other community water sources. Also the technique is now spreading to geographical spread to states in north, north east and south of the country (see table 2).

Finally, farmers' acceptance for additional benefits such as crop quality and earlier harvesting is also growing. The second trend is in the system types and the hardware: Interest of fertigation is picking up among farmers, especially for sophisticated irrigation/fertigation systems in protected cultivation. Online emitters tend to replace inline emitters, low discharges gradually replace high discharge emitters, subsurface drip systems develop for their benefits such as mechanical harvesting, thinwall (single season) tapes develop for cost advantages, and system automation is

Table 1: Highest Growth Rate of Irrigation Industry is in India

Year	Total Area Under Micro Irrigation in India, million ha
Upto 2000	0.920
2001 to 2006	0.310
2007	0.400
Total	1.630

nts, New Trends



increasingly popular for the additional water savings and operational efficiency that it brings. In the Sprinkler market, two trends develop: rainguns sprinklers for facing the problem of short period of electricity availability and shiftable sprinkler systems are gradually replaced by semi permanent and permanent sprinkler systems. Finally from a technical stand-

point, there is increasing farmer willingness to face the clogging problems and to engage in proper system maintenance. Last but not least, there are new trends in institutional support: The state government budgetary allocations are increasingly combined with multilateral loans and an increasing proportion of central govt. funds go directly to districts, which promotes a

faster adoption of the technology. At the same time, irrigation companies are creating large scale production & distribution networks and there is a focus among agricultural institutions for collaborative research in efficient irrigation.

THE ESSENTIAL ROLE OF THE IRRIGATION INDUSTRY

The local industry is currently working hard to upgrade (quantitatively & qualitatively) manufacturing capabilities. However this will not suffice to speed up the development of the market. Anil Jains identifies six areas where the industry should work harder: (1) industry should evolve products suitable for small sized farms; (2) it should avoid imposing products of manufacturer convenience; (3) every company should create

फळबागेच्या अवघड गणिताचं सोपं उत्तर जैन ठिक्क

वेळापत्रक घेण्यातून, फळाबागेतून, जैन ठिक्क अन्वयानुसार वापर करून घ्या. जैन ठिक्क अन्वयानुसार वापर करून घ्या. जैन ठिक्क अन्वयानुसार वापर करून घ्या.

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a pool of technical and agricultural expertise; (4) create effective distribution networks to make available the spares and services; (5) focus on enabling farmers to improve yields & quality along with input savings and last but not least the industry should avoid malpractices for quick benefits, which can create set back to the concept itself. ■

Table 2: Micro Irrigation area in Different States (in ha)

State	Area under micro irrigation (in ha)-2001		Area under micro irrigation (in ha)-2007
	Drip	Sprinkler	Drip
Assam	0	936	0
Andhra Pradesh	64300	11400	155000
Haryana	3400	76000	6000
Himachal Pradesh	800	976	1200
Gujarat	21000	46400	54000
Karnataka	57120	7200	114000
Kerala	7300	1600	10500
MadhyaPradesh	NA	89600	6500
Maharashtra	172190	4500	350000
Orissa	3896	NA	3000
Punjab	1900	80000	5000
Rajasthan	5100	192000	35000
Tamil Nadu	47800	NA	117000
Uttar Pradesh	2100	NA	4600
Other states	1725	NA	2200
Total	388,631	510,612	864,000

Source: NCPA, Ministry of Agriculture, Planning Commission, State Agriculture Departments

SOME DIFFICULTIES TO OVERCOME FOR THE DEVELOPMENT OF MICROIRRIGATION IN INDIA

1. high initial costs, especially for closely spaced crops
2. savings in water & electricity are not an incentive to farmer to invest on irrigation
3. large scale of operations and manpower requirements to support millions of farmers
4. geographical spread of farmers
5. small and fragmented landholdings
6. need for tailor made systems for each farmer
7. polymer price rise and inability to vary prices as frequently as polymer prices change
8. varying tax laws in different states
9. documentation requirements for availing government subsidies & bank loans
10. delays in release of subsidy and bank loan disbursement (cash flow difficulties)
11. delay in release of matching funds by state governments
12. spurious or non-serious manufacturers