

## **PROFIT IN LAKHS**

Cover Story - By Nemmi George

Here only one or two types of vegetables are grown in 1 acre of plant of land, yet the profits are spoken in lakhs. Visitors throng here right from London school of economics to the farmers of Kottayam. Everybody reach here to see 'Thulliya pannayam' otherwise precision farming.

The attention of the entire nation is on our neighbouring states' Dharmapuri and Krishnagiri districts. They are the largest precision farming experimental plots of the nation and the smallest Indian replica of Isreal. The precision farming technology that has been harnessed by America and Isreal is now in India. Precision farming can be coined as 'exact' or 'precise'. In Tamil it is called as 'Thulliya Pannaya Vivasayam' which means farming using drop by drop of water.

Krishnagiri and Dharmapuri are not unknown to Keralites. Buses plying to Bangalore and Hosur pass through these two places. Dharmapuri is just before Hosur and Krishnagiri is close to Dharmapuri. The four lane highway of L&T crosses through these two districts. A majority of the Keralites should have passed through these districts knowingly or unknowingly. But none of us were aware of the silent revolution that was happening here.

In Tamilnadu, the scientists are with the farmers in the field. They stay there for weeks. The result is, record yield in all crops. The national average yield of brinjal is 16 tonnes/ha and the best farmers in Tamilnadu obtained 80 tonnes whereas precision farmers got upto 350 tonnes/ha. The growth from 16 to 300's of tonnes is solely due to research. In tomato the national average is 17 tonnes/ha, the best farmer in Tamilnadu obtained 60 tonnes whereas in precision farming the yield is 150 tonnes. Similarly in banana, the national average stays at 35 tonnes, while precision farming yielded 120 tonnes. These are wonders indeed.

It was a great challenge for a team headed by Dr. E. Vadivel. They were to find 100 farmers for precision farming experimentation. This was the trouble in the first year. The second year saw yet another trouble of managing the farmers.

Dr. E. Vadivel is the Director of Extension Education in Tamilnadu Agricultural University located at Coimbatore. The University took up the task of covering 400 ha of precision farming within 3 years on behalf of the government. The university took up the tender for 7 ½ crores against a multinational company which quoted 17 ½ crores. Dr. E . Vadivel was the leader with Dr . I . Muthuvel as his right hand, since the project has been successful, the Pondichery government is now seeking for Dr . I . Muthuvel.

The blueprint of the project is as follows. To start with experimentation was initiated in 100 ha with 100 farmers. In the second year it was extended to 200 farmers. This was extended to 400 ha and 400 farmers in the consequent years. The estimate for 1ha of farming was Rs.75,000/- for drip and Rs.40,000/- for crop production. This amount was given as subsidy to the farmers by the government in the first year. In the subsequent year, 10% of the subsidy was reduced and in the third year, 20% was reduced. The aim of the government was to uplift the farmers from the depression caused due to increased cost of production. To make farming profitable Dr .E .Vadivel and his team took up this task. Though discussions with farmers extended to weeks in farms, cattle sheds and godowns, they were not able to get even 50 farmers. They started the project with those available at hand. Other farmers who saw that something was happening around too joined in the project. A silent revolution - without even the media noticing it. Three years later, precision farming was highly talked about in Tamil media. The result was that many stakeholders wanted to become part of the project. The government yielded to this response. The project was sanctioned at 50% subsidy to all the districts.

The journey from Coimbatore to Krishnagiri takes 7 long hours. Hence the Krishi Vigyan Kendra located at Dharmapuri took active participation in the projects' implementation. A Regional Research station is located at Paiyur in between Krishnagiri and Dharmapuri. Here one staff quarters was converted into a guest house for the scientists who came from Coimbatore. The scientists contacted the farmers by staying here and so the distance between the farmers and scientists was reduced.

The farmers felt at home, when they visited the University. The trainees hostel provided for the farmers here is having a star hotels facilities. Five Technology Parks are established at Tamilnadu Agricultural University to facilitate training at any time and on any subject. One of these technology parks is equipped with all the latest

gadgets in information and communication technology. When university worked for farmers and farmers for university, the 100ha in Dharmapuri spread to the entire nation. There will be a period when Tamilnadu will become the Isreal in India.

## **THE SUCCESS OF FARMERS' ASSOCIATION**

*Farmers and scientists shed down the attitude 'Our knowledge and their ignorance and shared their expertise to see the victory of precision farming.*

1) What is the reason for the victory of precision farming? Is it the governments' constant efforts or the expertise of scientists of the university?

Both were equal in efforts. More than that was the continuance of governments' policies. Jayalalitha government initiated the project while the following the Government of Karunanidhi took it up with the same spirit. Farmers in our project include ex-MP's and present MLA's.

2) What was your working style?

We spend most of the time with the farmers. We discuss with them regularly and both of us benefit from each other. One of the books published in this project is 'Expertise gained and Experience shared'. We were ready to learn many things from the farmers. What we learnt from them was more than the expertise that we passed over to them. We were able to refine our research, education and extension methods in light of their local knowledge.

3) How was the precision farming system implemented?

This was implemented through farmers Association. Each village formed one cluster. They are all registered societies. They meet once in a month to discuss on their experiences. If they had any doubts they call upon us to solve them. These associations themselves draw out the projects' implementation plan; and also review the progress. The success of precision farming in Tamilnadu is mainly due to effective functioning of those groups/associations.

4) Which stage gives you the most happiness in this new victory?

I am very happy to see that all the members have gained more, in terms of income, social respect and technology. During the initiation of the project the government had set a goal of increasing the yield by 50% only. But I am happy that we could achieve many fold increase over this. I am also satisfied that the use of pesticides has been reduced to half.

5) Can your success be attributed to modern technologies?

This is not a modern technology, it is being practiced by other countries for many years. We have just refined the technology to suit our conditions. Conventional technologies like using of chisel plough also has been included in this. Likewise equal importance has been given to soil health maintenance and higher yield.

6) Why is this called 'precision farming'?

This is because every activity is done exact and based on need. For example, if 1 acre requires 1 kg fertilizer, exactly only 1 kg of fertilizer is applied, not a gram more. If irrigation is to be done for half an hour then it is done for only ½ an hour. Similarly all activities are carried out with the same precision.

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## **SHOP, COMPANY AND NOW MEGA MARKETS**

Education or global experience is not essential for the creation of a proactive worker. This is explicit at Dharmapuri because a majority of the precision farmers have not completed school education yet they run one of the biggest Agro service centre at Dharmapuri. They have set up a sales centre to sell their own produce. The next agenda online is to establish a market for themselves. The producer company has been registered under the companies Act and named as Dharmapuri precision farmers Agro service company Ltd. This company was started with the investment of Rs.10, 000/- by 166 farmers. Presently the marketing of vegetables grown by precision farming is governed by this company. The Reliance reached Dharmapuri to procure vegetables. The president of the farmers company insisted that they get Rs.13/kg of brinjal. Reliance had to submit to their demands. Aditya Birla Group and Wallmart also made attempts but in vain. The farmers company sells most of its produce to Kochi market and Safal market in Bangalore. Safal market is run by National Dairy Development Board. These markets give them higher returns.

The Agro service company has all the inputs required by farmers. All the precision farmers buy their inputs from this company. The company does not make any profit out of it. The farmers benefit from them, because the cost is lesser than other input dealers. Moreover this has created some misunderstanding with those input dealers. The Agro service centre has become the agencies for Jain Irrigation, Mahyco and Namdhari seeds. They take up the sales of pesticides and fertilizers too. This has become a onestop shop for the farmers.

The farmers company plans to start a 'Mega Uzhavar Sandhai' or Mega market. Tamilnadu has Uzhavar Sandhai already hence this is termed as Mega Uzhavar Sandhai. There will be six types of sales in this market. They are as follows: i) Vegetables kit suitable for a family of 3-4 members for a week. ii) Cut vegetables for hotels. iii) Online marketing using credit cards and internet. iv) Bulk supply to schools and canteens. v) Retail outlets in Bangalore and Chennai. vi) Export oriented packing.

The total budget requirement estimated is Rs. 8crores. The farmers are ready to contribute Rs. 2crores by collecting Rs.10,000 from 2000 farmers Rs.2crores is expected to flow from traders and 'the remaining Rs.4crores is sought from the

Government ' says Chinnaswamy,P.M , President and Mr. C.Bhoopathy, secretary, of the farmers company.

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## **DRIP REVOLUTION- A GRANNY'S OUTLOOK**

*'What does precision farming mean to the common farmers, apart from its science and technology'*

Pennagram is a small village near the main centre of Dharmapuri. We inquired about precision farming to an old lady in the roadside an intuition to know to which level the knowledge has reached. Her replied included all the basics of precision farming namely, Chisel plough, Raised bed, black pipes (meaning drips ), fertilized water ( uranthani fertigation ), drip irrigation, more brinjal, tomato, banana, etc.

There are 5 precision farmers Association in Krishnagiri and 6 in Dharmapuri district. They form the precision farming army. They are on par with any scientist in explaining the latest system of farming. Precision farming has been modified to reach the common villagers. We shall start with granny's words.

### **Chisel plough:**

Ploughing is done using tractor. The rear part is removed and the old model plough is fit to it. This is called Chisel plough (Uli kalapai ). This will plough 2 feet deep. The ordinary plough scrapes only the upper surface. Chisel plough, when used for once in 2 years, soil becomes highly loose and porous. This helps in deep rooting and aeration below the ground surface.

### **Raised bed:**

Making of tall ridges is called raised beds. Beds and channels are used for farming. The beds have 1feet height and 4 feet width. The channels are 1feet deep from the ground surface. Thereby a total of 2feet below the upper surface of bed. In each raised bed two rows of crops are grown at a distance of 3 feet. Banana is raised only in one row on this bed.

### **Drip pipes:**

Irrigation is given using drip method. Tubes of finger thickness are used for this purpose. Each lateral unit has two tubes. The distance between two such lateral unit is 1 ½ m or while the distance between two tubes in a single lateral unit is 3 feet. This aids in supplying water to two rows of crops on the raised bed. The drip pipes are fitted with nozzles. The emitters are not kept outside, they are kept within. These are manufactured



by Jain Irrigation Ltd. The distance between two emitters is 3feet. Water does not drip throughout, based on the water requirement irrigation is done upto a maximum of 1hr per day. Reduced water usage is one major reason for the success of precision farming in the water scarce Dharmapuri district.

### **Fertigation :**

Fertigation is commonly called ‘Uranthani’. In the beginning of the drip system (i.e.,) the main pipe, water filter unit is fixed. Close to it is the mixing unit where fertilizers are mixed with the irrigation water. Special fertilizers are used in this system. They are water soluble fertilizers imported from Isreal. Mainly two types of fertilizers are used NPK 19:19:19 and Multi K 13-0-45. one kg of the first and 3kg of the latter is sufficient for 1 acre for 1 time of fertigation. However the periodicity is decided based on the crop growth. Micronutrients named Micelf is also given in slight dose. The fertilizers are manufactured by Heiff chemicals, Isreal. The required chemicals at the required time in the root zone is the specialty of this system. This saves 50% water over the conventional method.

### **Higher yield in Brinjal :**

Our granny says more brinjal, tomato..., Tamilnadu Agricultural University gives the statistics.

<b>S.NO</b>	<b>CROP</b>	<b>YIELD</b>	<b>TONNES/HA</b>	<b>INCREASE %</b>
		<b>National average</b>	<b>Precision yield</b>	
1	Tomato	17.35	150	764.55
2	Chilli	12.02	35	191.18
3	Brinjal	10.46	156	1334.03
4	Ladies finger	6.28	16	154.78
5	Tapioca	25.52	52	103.76
6	Turmeric	4.95	9	81.81
7	Sugarcane	80-100	250	177.77
8	Cotton	15-20(Quintal)	30(Quintal)	111.43
9	Watermelon	12.71	60	372.06
10	AshGourd	21.95	40	82.23
11	Onion	11.32	21	85.51
12	Banana	28.58	110	284.88
13	Cabbage	14.38	120	734.49
14	Cauliflower	14.22	33	132.06

15	Pumpkin	11.91	50	319.81
16	Bittergourd	6.23	15	140.77
17	Ribbedgourd	15.85	34	114.51
18	Bottlegourd	12.21	66	440.54
19	Cucumber	6.48	20	208.64
20	Beans	5.8	12	106.89
21	Beetroot	16.75	35	108.95
22	Rose	10lk stems	25lk stems	150.00
23	Marigold	10	25	150.00
24	Chrysanthemum	8-15	25	117.39

### **Marketing:**

The farmers in Tamilnadu never had to search markets for their produce. Kerala is their biggest market. More than 50% of their produce are sent to Kochi market. The best quality goes to Safal Market in Bangalore where it fetches more prices. The remaining finds place in Tamilnadu markets. Marketing is by collective bargaining by the associations. Moreover, Dharmapuri Producers Company also has created its own identity.

### **Other details:**

Our granny has not done farming. Her words missed out the following – seed, land preparation, nursery, group strength, etc.,

### **Varieties:**

The vegetable growers in Tamilnadu are different from Keralites. In Kerala, only the subsidized government seeds are mostly used. Whereas in Tamilnadu the farmers usually go for hybrid seeds developed by private seed companies. They are ready to pay more than Rs.10, 000/- for seeds alone. The popular seed firms for vegetables are Mahyco, Namdhari and US seeds. In Kerala, seeds of hybrids are used, whereas in Tamilnadu, hybrid seeds are used. In the latter, hybrid vigour is more as it is 1<sup>st</sup> generation of hybrids.

### **Nursery:**

The farmers do not raise individual nursery. The associations grow community nursery to meet the demand of its members. Since the seeds are costly, care is taken not to waste even a single seedling. Portrays are used to grow single seedlings. The pits in the portrays are filled with vermicompost and coirpith. One seed is dibbled into each pit. When grown up the seedlings are transplanted along with the growth media. Community nurseries are always in polyhouses, maintaining temperature by the use of mist irrigation.

**Land preparation:**

The first step in land preparation is ploughing using chisel plough. Four types of fertilizers are used. Straight fertilizers (urea, potash ), organic manure (cowdung, poultry manure, vermicompost ), biofertilisers (trichoderma ) and water soluble fertilizers ( 19-19-19, Multi K ). They are applied at four stages of plant growth. i) root fixation (10-15 days ), growing stage (upto 45days ), flowering stage and harvesting stage. The scientists of Tamilnadu Agricultural University has given the exact dose for each of these stages. It is highly precise.

**Remote sensing:**

Satellite technology has been used but with limitations to get the soil formation map and utilization map. Apart from survey, the area of the farms was also estimated using this technology.

**ABBREVIATIONS:**

In precision farming three abbreviations are commonly used. They are RS, GPS and GIS. GPS means Global Positioning System, which a particular farm or portion of farm is taken up for study using satellite. RS stands for Remote Sensing- which takes data on various aspects of this area. GIS stands for Geographical Information System- which is the use of the data obtained from satellite for various benefits.

## **DEBT TRAP IS AN OLD TALE**

Denkanikotta Taluk in Krishnagiri district is the Telangana of Tamilnadu. The villagers here are settlers from Andhra Pradesh. They speak only Telugu even now.

P.Ramareddy entered into farming 40 years back after he obtained his degree. Earlier farming was lucrative but later it turned to be a total loss. From his 5 acres of land, he had a debt of Rs.6 lakhs. In 2004, he entered into precision farming. He was able to repay his debts within 3 years and he has Rs.5 lakhs as his bank balance. Along with him 50 farmers in Sargapalli village have ventured into precision farming.

He has cultivated a total of 25 vegetable varieties, including Cabbage, Cauliflower, Tomato, chilli, Beans, etc., Grand Naine Banana, Dutch rose, Marigold and also Chrysanthemum. This 57 year old farmer is all in all of precision farming, he explains this system more scientifically and truthfully than any other farmers.

## **INDEGENEOUS PESTICIDE CONTROL**

Ramareddy explains two successful indigenous practices.

- 1) **Pesticide:** Grind 1 kg each of Ginger, Garlic and Chilli and mix it with 5lt of cow's urine to make it a paste. Keep it for 2 days. Later mix 5ml of this paste in 1lt of water and spray to efficiently control pests.
- 2) **Disease management:** Mix 1lt of water with 200ml of pseudomonas suspension and 500gm of glucose. Keep it aside for 1 day. The next day mix it with 2lt of cows milk and 200lt of water and spray it for effective disease management.

Neither Tamilnadu Agricultural University nor Dept of Agriculture is the reasons for the success of precision farming. The real heroes are the farmers. Let us meet a few of them.

According to Reddy- Maximum yield, minimal toxins, maximum profit is the thumb rule for precision farming. A minimal toxin doesn't mean that this is an organic agriculture practices. The number and doze of chemicals is lesser than the conventional farming. Hence, the products of precision farming are less toxic when coming to the market.

Precision farming differs in its land preparation by deep ploughing. Soil is supplied with organic manure and biofertilisers. Raised bed is prepared for crop growth. the benefits are that the root penetrates deep into the soil hence the plants become sturdy. Another important aspect is the drip irrigation and fertigation. This reduces the use of water besides reducing the growth of weeds. Earlier Ramareddy had to engage 60 labourers for weed management, presently he needs less than 10 labourers. The profit out of this amount to Rs.6000/- earlier watering required 3men labourers, now it involves only changing the valves to the required side. Earlier irrigation required 1 full day of motor use, now it is reduced to 8 hours at the maximum. Previously, all the farmers including Ramareddy searched for markets after producing the crop, nowadays they decide the market before producing the crop. As a result of which they have stopped tomato cultivation during the month of November and December because at the time of its harvest (i.e) March and April, the price of tomato is the least in the markets.

The intense use of pesticides and fertilizers have also been reduced to judicious mix of organic manure, biofertilisers and water soluble fertilizers. The same is the case in pesticides. Earlier in Cabbage, pesticides were sprayed once in 5 days. Now only 4 sprays are done in total. The American boll worm which was a serious pest in tomato is now no more visible. Less moisture, clean cultivation, required pesticide application and biopesticides have reduced the use of pesticide thereby creating more profit.

At any time, if any doubts arise the farmers are calling upon Dr. E.Vadivel in his mobile number. He is available at any time of the day.

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## **CHINNASWAMY BECOMES 'PERIYA THALAIVAN'**

The life of P.M.Chinnaswamy of Muthu gounder kottai explains to what level, precision farming can alter the life of a common farmer.

Chinnaswamy who is 42years old has not completed his schooling successfully. He started farming while learning and he switched over to it. He has only 5 acres but now he is traveling in a 'Scorpio' or a 'Bullet' which looks brand new. In this village, recently a farmer has purchased 'Scorpio'. Chinnaswamy is the president of the precision farmers owned Producers Company. Though he knows only Tamil, he communicates well to the executives from Reliance, Aditya Birla and Safal. His company has started on Agro service centre to stop the monopoly of seed, fertilizer and pesticide dealers. C.Bhoopathy, is the secretary of the company.

Like Ramareddy in Krishnagiri, Chinnaswamy is the precision farming scientist of Dharmapuri. He teaches precision farming to other farmers. He is the right hand to Dr.Vadivel when he comes to Dharmapuri.

On asking Q:'Why are you doing precision farming

The answer came in a second 'to earn profit'

Q: To get profit you can grow tobacco?

Ans: If the government allows I will do.

When farming is my occupation, I have to earn profit from it otherwise I have to go home says Chinnaswamy. He has the capacity to kindle the other farmers and also to keep them under control. This is visible in Dharmapuri. When asked his opinion about precision farming. The answer was readymade- precision farming is the right kind of farming.

Though he has to spend more time for the company and shop, he did not reduce attention over his farm. From morning 10.am to afternoon 3.00pm he spends for the company. He also spends 9 hours in the field- Morning 5.00am to 10.00am and evening 3.00pm to 7.00pm. presently, he is cultivating Ragi, Brinjal and Turmeric. He gets upto 30kg from a single Brinjal plant. In one acre, he has 6000 such plants. Green brinjal gives 100 tonnes/acre while purple brinjal gives 150 tonnes/acre. Presently the price is Rs. 4/kg in Dharmapuri. At times, the price has soared upto Rs. 15/kg. as the rate increases the profit also jumps high. **PHONE:** 09865151701

## **ROSE CULTIVATION IN OPEN FIELD**

Mr. Manjunath Reddy has been able to cultivate Dutch Rose in open air under precision farming.

For Manjunath Reddy precision farmings' strength is not only profit but also an innovation. Till date Rose was being cultivated in polyhouse. Based on his own experimentation, Manjunath brought Rose out of polyhouse to the open field. The result was 100% success and profit upto Rs.2 lakhs.

Dutch rose variety is grown in Krishnagiri which is close to Hosur. Presently each village occupies 10 acres of Dutch rose in open field. Market is at Bangalore which is just 40km away. One bunch of flower is priced at Rs.60/-. Each bunch consists 20 flowers in red and yellow shades. The gross income from 1 acre of land is more than Rs.4000/-, per day while the expenditure per day is Rs.1000/-. Hence on an average the net profit is Rs.3000/-. Rose cultivation requires high care for fertilization, pest and disease management, hence farmers do not cultivate rose in large stretches. They cultivate it along with 'Marigold, Chrysanthemum, and Aster'.

Another important flower that yields well in precision farming is Marigold (Banthi ). One acre can hold 12,000 plants. Harvesting can be done 2 ½ months after planting, and it can be continued for 150 days @ 1 pinch /week. In one season about 8 tonnes of flowers can be harvested. The price for 1kg is Rs.5 to Rs.40/-. On an average one gets Rs.20/kg. In conventional system the yield is 4 tonnes, while in precision farming the yield is 8 tonnes/acre.

## **UNENDING DRIP AND UNFAILING REWARDS**

The banana field maintained by G.Mahendran gives 60 tonnes/acre with drip irrigation.

Mahendrans' strength is banana that too Grand Naine banana. Mr.Mahendran of Nallampully, Dharmapuri district, is recognized as 'Kulapathi' of banana by local farmers. He considers precision farming as the only reason for this victory. According to him Dharmapuri got its victory in 2004. If Gandhiji got India its freedom, Dr.E.Vadivel got Dharmapuri its freedom, because he brought precision farming to Dharmapuri along with all good luck.

He grows Grand Naine banana variety in his own 5 acres of land and also another 5 acres which he has taken for lease from his Father-in-law. Anybody will look back again to see his bunches. Each weighs about 50kg. Nallampully also faces water shortage. In precision farming, irrigation is carried out in drip for only 1 hour/day; yet there is no reduction in yield. It is right to say that Dharmapuri got its freedom in 2004. The price for banana is Rs.5/kg in Dharmapuri. For a bunch of 50kg, the average price is 250. in some seasons the price goes upto Rs.8/kg. one acre holds 1200 banana crops. He is sure to get 60 tonnes of banana. He says he is sure to get Rs.2lks/acre after deducting his production cost. **PHONE:** 09994790646

### **SINGLE MAN'S FEAT IN TWELVE ACRES OF LAND**

Subramanian who once was ready to quit farming because of water and labour shortage, is now earning Rs.2lakhs per acre.

Mr.M.Subramanian of Palayam puthur, Dharmapuri district stays distinct among the other farmers because he carries out all operations of the field except for transplanting and harvesting. He is a graduate in BA and was working as village Administration Officer. He has served as Panchayath Chairman in Block for 14years, later he quit politics and entered into farming.

Though he had 12acres of land, the problem was labour and water shortage. He decided to quit farming, at this junction precision farming came not only to his rescue, but also gave him 2lakhs profit per acre, of the 5acres he cultivates. Presently he is cultivating tomato and chillies with just one well for irrigation. Water shortage is the



major problem for Dharmapuri farmers. Before the advent of precision farming, the farmers were of the feeling that no crop would give any profit. Now Subramanian requires only Rs.17,000 of water to irrigate for 1hour. There is sufficient water for drip irrigation.

The second problem was labour shortage when farming was not lucrative, farm labourers began to switch over jobs. Now Subramanian requires labourers only at two stages. One during land preparation for using Chisel plough and farming ridges and furrows he requires 5 labourers. Later he requires labourers during harvesting. This requires more labourers as the yield is more than 40 tonnes. Atleast 7 labourers are needed daily. After all expenses, the net profit stands at 2lakhs/acre. What more is required says Subramanian.

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## **FARMING WITH NO BLANKET RECOMMENDATION**

What is meant by Precision Farming? It can be commonly called as a system of farming that corrects a lot of our practices and beliefs. For instance, handful of fertilizers, one basket of cow dung and irrigation for quite sometime are some of the phrases commonly used in blanket recommendation. But in Precision Farming there is no blanket recommendation. There is value for every gram and every second. This is what exactly precision farming means.

### **'Prescribed' Farming:**

Precision farming can be called as prescription farming. Just like we have dosages for medicine, this system of farming also prescribes dosage based on the type of soil and crops grown in a particular region. Each farm has its own specific problems and needs. Precision farming gives remedial measures based on the specific problems. Satellite technology is utilized for this purpose, more specific technologies are Remote sensing, Geographical position system and Geographical Information system.

Remote sensing helps to find out the region specific soil fertility status, moisture availability, and electrical conductivity. Similarly the climate, soil status and water availability can also be obtained. It varies from farm to farm, and over time. Precision farming solves such problems.

Conventional farming depends on common or blanket recommendations. The recommendations are limited for hilly regions, sand soils and garden lands. It does not take into consideration the intricate differences within these regions. There is no specific recommendation for water and fertilizers. They are mostly used either in excess or in deficit.

### **Mapping- The first step:**

At the very beginning of precision farming, maps are drawn based on the type of crop and soil for distinctive regions. These maps depicts the differences between farms, thereby helps to solve the problem. Mapping is done with the help of modern scientific technology. Hence to implement precision farming successfully, the support from the Government is essential. The precision farming followed in Tamilnadu too is

not the exact replica of the precision farming followed in America or Isreal. Only the possible technologies have been included.

The data obtained from the field and that obtained from the satellite are clubbed together to get the exact information and based upon which the plans are made. Various maps are also created based on these data. They are water requirement map, fertilizer requirement map, pest surveillance map, yield estimation map and the like. This is the main part of precision farming.

Once these basic data are generated, their execution is the next step. The practicality of precision farming has made it different from the conventional farming. The full utilization of satellite technology would have taken it to even more heights and records.