STUDY ON PRECISION FARMING PROJECT

Report No 221

(For Official Use only)

Monitoring and Evaluation Unit

Directorate of Agriculture

Chepauck Chennai 6000 065

<div align="center">**STUDY ON PRECISION FARMING**</div>

Introduction

Tamil Nadu Precision Farming Project is a Tamil Nadu State sponsored turn key project implemented at Dharmpuri and Krishnagiri districts started by 2004-05 for a period of three years. The first crop of vegetable is to be raised with the latest State of art technologies, including remote sensing.

Objective of precision farming

- Promotion of market led horticulture
- Empowerment of farmers and farmers forum
- Training the farmers in the latest state of art cultivation of technologies
- Promoting hi-tech horticulture in built with precision elements.
- Exploitation of genetic potential 100 per cent.

Objective of the survey

During the year 2006-07, it was decided to take up a study on precision farming with the objective of knowing the impact of precision farming.

Districts covered and sample size

The survey was conducted in Dharmapuri and Krishnagiri districts with the sample size of 30 number of farmers, doing precision farming, 10 number of non precision farming farmers and one Assistant Director of Horticulture per district. In total, 80 number of farmers and 2 department personnels were surveyed.

Survey period

The survey was conducted during November, December of 2006.

Reporting and tabulation

The survey was conducted by the Monitoring and Evaluation staff at district level under the supervision of the district officials and scrutinizing and consolidation, compilation was done by staffs of Monitoring and Evaluation wing of this Directorate.

Salient Findings

- In Dharmapuri and Krishnagiri districts put together, 23–24% of the total cultivable area is covered by Horticultural crops.
- The survey was conducted with 60 farmers. Wherein 58% of the respondents belong to 25–50 years of age group and 42% belongs to above 50 years.
- Only 10% of the respondents are illiterate and 90% of the respondents are literate.
- 2% of the respondents comes under Marginal Farmer category.
- 15% of the respondents comes under Small Farmer category and
- 83% of the respondents comes under Big Farmer category
- 60% of the respondents belongs to BC
- 30% of the respondents belongs to OC
- 5% of the respondents belongs to SC/ST
- 100% of the respondents owning the lands
- 62% of the respondents are having more than 10 years of experience in vegetable cultivation
- 30% of the respondents possess 5–10 years of experience
- Precision farming came into existence during 2004–05.

Vegetables cultivated by precision farming are cole vegetable, all types of gourds, all types of bean, flowers like golden rod, china aster, marigold, banana, bhendi, chillies, radish, tapioca, brinjal, capsicum, onion, gherkins.

The technologies adopted are

- Cultivation of hybrids of tomato, brinjal, chillies, bhendi, raddish

- Supply and use of seedling of tomato, brinjal, chillies, raised in poly houses.
- Use of tissue culture banana
- Fungicide treatment
- Basal application of super phosphate
- Drip fertigation
- Application of recommended bio fertilizer, biocides
- Adoption of need based plant protection measures
- Remote sensing
- Use of chisel plough
- Hi-tech community nursery
- Growing crops and growing with crop market support
- 97% of the respondents felt that there is an yield increase over the conventional method
- 87% of the respondents spelt that the cost of cultivation reduced, when compared to usual method of crop production
- 100% of the respondents are happy with the fertilizer application through drip fertigation
- 100% of the respondents said that additional yield, high remuneration, water saving, technical guidance, reduced cost of cultivation, empowerment of farmers are the major benefits obtained in precision farming.
- 20 number of other farmers also interviewed. They also felt that the precision farming is high beneficial and remunerative. After seeing the merits a sum of around 180 number of other farmers are also started to follow precision farming.
- The subsidy amount was given to the farmers loyally
- Difficulty in marketing the produces, blockage in drip units, closer dripper distance are the some of the obstacles faced by the farmers.

Conclusion and suggestions

Precision farming seems to be a successful one, which is liked by the farmers. Mainly the cost of crop cultivation gets reduced by input saving, drip fertigation, adoption of need based plant protection measures, timely availability of technical guidance, follow up by the officials, water saving measures all put together increases the glory of the precision farming.

From the survey finding, the farmers may be trained maintenance and management of drip units and in drip fertigation. The distance between the drip units may be maintained as 4 feet instead of 5 feet.

As per the farmers liking, subsidy may be given for soluble fertilizer as of straight fertilizer. Further more water saving technologies may be taught.

Since more number of farmers are willing to adopt precision farming, the scheme may be operated in larger area, covering more number of farmers. Crop based farmers interest groups, farmers federation may be made by the department / NGO's which will be helpful to the farmers to improve their economic status. The development of infrastructures like cold storage, collection centre, transport facility will reduce the farmers anxiety and induce them to produce more quality products of export standard.

DETAILED FINDINGS

Table : 1

This table shows the total cultivable area of Dharmapuri and Krishnagiri districts and area under Agricultural crops and Horticultural crops. During the year 2004-05, the total cultivable area of 350083 Ha, 268943 (77%) Ha was under Agricultural crops and 81140 Ha was covered under Horticultural crops (23%). Likewise, in the year 2005-06, out of 343228 Ha of total cultivable area, 260454 Ha was covered by Agricultural crops, which is 76% of the total cultivable area and horticultural crops were cultivated in an area of 82774 Ha which is 24% of the total cultivable area.

Table :2

The table exhibits the method of irrigation followed for Horticultural crops for the years 2004-05 and 2005-06. During the year 2004-05, 81140 Ha was under will irrigation and out of 81140 Ha. 602 Ha was under drip irrigation and in 27750 Ha, flood irrigation was followed. During the year 2005-06, area irrigated by river was 82774 and 930 Ha was under drip method of irrigation and 28500 Ha area was irrigated by flood method of irrigation.

Table :3

This table shows the classification of farmers based on age, Educational qualification. Out of 60 numbers sample size 35 respondents (58%) belongs to the age group of 25-50 years, 25 respondents (42%) belongs to the age group of above 50 years. While looking into the literacy level 10% of the respondents are illiterates, 32% are coming into the category of primary education, 40% belongs to high school level of education and 18% comes under the college level of education.

Table : 4

This table shows the farmers classification based on the land holding and social status. Among the 60 respondents only 2% belongs to MF, 15% belongs to SF and 83% belongs to category. Regarding social status, 5% comes under SC/ST category, 60% comes under BC category and 35% comes under other category 100% of respondents are possessing own lands.

Table : 5

This table exhibits the experience of the respondents in vegetable cultivation. 8% of the respondents are 5 years of experience, 30% of the respondents possess 5-10 years of experience and 62% of the respondents possess more than 10 years of experience in vegetable cultivation. The vegetables cultivated are Tomato, Brinjal, Gherkin, Chillies, Bhendi, Banana, Radish, Turmeric, Tapioca, Cabbage, Cauliflower, Abhinaw, Enopine, Capsicum, French beans, Cluster beans, lablab, Coriander, Potato, Ribbed gourd, Snack gourd, bottle gourd, Rose, Onion, Cucumber, Beetroot, Golden rod, Marigold, Banana. While looking into the % of Vegetable area, to total area holding which comes 10% and 15% respectively for the years 2004-05, 2005-06 respectively.

Table : 6

This table shows the method of irrigation of Horticultural crops for the years 2004-05 and 2005-06. Out of the 60 respondents, during the year 77% of the respondents followed well irrigation which covered 136 Ha and that too 53% of the respondents adopted drip irrigation and during the year 2005-06, 73% of the respondents followed well irrigation and 142 Ha was covered under vegetables 72% of the respondents have adopted drip irrigation, which covered 115 Ha of area.

Table : 7

This table shows the details of precision farming followed by the respondents. 100% of the respondents have followed and during the year 2004-05, 73% of the respondents have adopted precision farming and 77% of the respondents have adopted precision farming during the year 2005-06.

During the year 2004-05, 63 Ha of vegetables was cultivated under precision farming, which was expanded as 117 Ha during the year 2005-06. The vegetables raised under precision farming are Tomato, Chillies, Cabbage, Cauliflower, Bhendi, Banana, Radish, Tapiaco, Capsicum, all gourds, Cucumber, Beet root, Marigold, Coriander, all kinds of beans and Brinjal.

Table : 8

This table exhibits the technologies adopted in the precision farming and the area increased by precision farming. 8 number (13%) of respondents revealed that they received the information on precision farming through department of Horticulture and 87% of the respondents revealed their source of information as Tamil Nadu Agricultural University, Coimabtore-3. During the year 2004-05, 46 number of respondents (77%) adopted the technologies and during the year 2005-06, 100% of the respondents followed the technologies of taught. 100% of the respondents have agreed that the area under cultivation was increased by precision farming, by means of saving of water, adopting drip irrigation and further more the respondents have witnessed 40 to 100% yield increases of the crops of precision farming.

The technologies taught and adopted in the precision farming

- Cultivation of hybrids of tomato, Brinjal, Chillies, Bhendi, Radish
- Supply and use of seedlings of Tomato, Brinjal, Chillies, raised in poly houses.

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- Use of Tissue culture banana
- Fungicide treatment
- Basal application of super phosphate
- Drip fertigation
- Application of recommended bio fertilizer, biocides
- Adoption of need based plant protection measures
- Remote sensing
- Use of Chisel plough
- High tech community nursery
- Growing crops and growing with crop market support

Table : 9

This table shows the particulars about yield increase reduction in cost of cultivation easy fertilizer application in precision farming.

97% of the respondents have enjoyed the yield increase by adopting precision farming.

The reasons attributes to the increased yield are

- Application / Adoption of need based technologies
- Drip fertigation which is a tool for getting 2 to 3 fold yield increase
- Technical follow up by the University Officials

3% of the respondents, who have not obtained increased yield, spelt that natural calamities, supply o aged seedlings as the reasons.

87% of the respondents have incurred reduced cost of cultivation, in precision farming, when compares to normal method of cultivation. The reasons attributed are, reduced labour cost in terms of irrigation and fertigation, free input distribution reduces the expenditure. Expenditure on weed control gets reduced by drip irrigation.

Some of the reasons felt by the 13% of the respondents who felt the cost of cultivation is not reduced by precision farming are need of more labour during harvesting and high cost of liquid fertilizer.

In case of fertilizer application, need based fertigation, no wastage of fertilizer, no need of labour, high efficiency, considerable less time of fertilizer application, adds value to the easy fertilizer application in precision farming.

Table : 10

This table exhibits the benefits obtained from precision farming 100% of the respondents revealed that Additional yield, reduced cost of cultivation, communication and adoption of right technology at right time. Additional area brought under cultivation. Considerable saving of water, periodical technical advise by the experts, drip fertigation. 100% of the respondents said that precision farming is high remunerative, since additional yield was obtained, maintenance is easy, reduced cost of cultivation is a booster to farming community, further the inputs are given as 100% subsidy the entire gross income could be considered as the net income of the farmers.

Table : 11

This table shows the adoption of precision farming by other farmers.

100% of the respondents have revealed that they have conveyed the benefits of the precision farming and the efforts taken by farmers, 152 number of farmers have come into precision farming having an increase in precision farming area, by addition 33 Ha.

Table : 12

This table shows the subsidy availed for precision farming, during 2004-05 and 2005-06. During 2004-05 the subsidy was 100%

and during 2005–06 90% subsidy was given. 100% of the respondents availed the subsidy both the years.

Table 13 & 14

This table reveals the obstacles faced by the farmers in precision farming and the changes need by the farmers. 50% of the respondents have said the obstacles as follows:

1. Difficult in Marketing the produce.
2. Additional expenses was incurred during second year
3. Blocking in drip units
4. The distance between two dripper is less

Opinion of the 50% of the respondents about the changes required are,

*   Subsidy should be given for suitable fertilizer as in straight, fertilizer.
*   Required new technology for removing the blocks in the drip units.
*   Continuous technical guidance is required for the ensuing years also.
*   The scheme may be extended to some other farmers with 100% subsidy with an intention to extend the technology.
*   Required further more water saving technologies to meet out the prevailing water crisis.
*   Distance between the drippers and rows must be adjustable.

Table 15 to 17

These tables reveal the opinion of the farmers those who have not followed precision farming 20 farmers were surveyed and details were collected. 100% of the farmers are aware of the precision farming the 10% (2 farmers) said that they know about precision farming through Director of Horticulture and Plantation Crops and remaining 90% (18 farmers are aware of precision farming through

Tamil Nadu Agricultural University, Coimbatore-3 and others from neighbouring farmers.

100% of the respondents have visited the nearby precision farming and they have express that they are willing to adopt precision farming because of the benefits derived by precision farming, such as:

* Increased production by 60% over the conventional method.
* Water saving
* Less maintenance cost
* Low cost of cultivation (COC)
* Input saving
* Good water management
* Timely Technical advice by the University
* Availability of Input materials at higher subsidy

100% of the respondents felt that precision farming is beneficial and they are willing to adopt it. The reasons attributed are:

* Additional area will be brought under cultivation
* Easy fertilizer application
* Easy and adequate Plant Protection measures adoption
* Quality products, which fetches higher market price and ultimate good profit.
* High useful during drought period
* Economic benefit is compared to farmers of conventional system, empowerment of farmers forum
* Subsidy percentage drip fertigation, high yield and more income are the attracting factors.

Table : 18 to 23

These tables exhibit the details obtained from the Assistant Director of Horticulture, one per district.

During the year 2004-05, 100 Ha was covered under precision farming with 102 beneficiaries, which doubled during the year 2005-06, i.e.200 Ha and the number of farmers benefited to 200.

The executing officers felt that the subsidy pattern, increase in yield, availability of technical advise, water saving, drip fertigation, higher yield and more income are the factors attracting the farmers, to go in for precision farming.

During the year 2005-06, 150 Ha of area was increased under vegetable cultivation, because of precision farming.

The vegetables cultivated under precision farming are Tomato, Chillies, Cabbage, Cauliflower, Brinjal, Banana, Tapioca, Water melon, Capsicum, French beans, Cluster beans, Lab Lab, Coriander, Potato, Ribbed gourd, Snake gourd, Ghernut Rose Onion, Cucumber, Beetroot, Golden rod, China Aster, Marigold, Rose, Carrot.

The technologies adopted are
- Cultivation of hybrids of tomato, brinjal, chillies, bhendi, radish
- Supply and use of seedling of Tomato, Brinjal, Chillies, raised in poly houses
- Use of Tissue culture banana
- Fungicide treatment
- Basal application of super phosphate
- Drip fertigation
- Application of recommended bio fertilizer, biocides
- Adoption of need based plant protection measures
- Remote sensing
- Use of Chisel plough
- High tech community nursery
- Growing crops and growing with crop market support

50% of the respondents felt that the difficulty in the maintenance of dripper units and drip fertigation are the obstacles faced by them in

the implementation process and to overcome them training was given to the farmers.

The suggestions given by the executing personnels are;

Since more No.of farmers are willing and interested in adopting the precision farming system, the scheme may be extended to larger area, covering more number of farmers.

Farmers group / clusters, federation of farmers may be formed on crop wise. Farmers may be helped by arranging for market tie ups with companies, which are dealing with retail business, which will encourage the farmers to go one step ahead.

Development of infrastructures like Cold storage, collection centers and transportation facilities will improve the production of quality products.

Part I GENERAL

Table : 1

Consolidation report for the special survey on precision farming							
Sl.No.	District	Total cultivable area of the district (Ha)		Total area under Agrl.Crops (Ha)		Total area under Horticultural Crops (Ha)	
		2004–05	2005–06	2004–05	2005–06	2004–05	2005–06
1.	Dharmapuri	169908	163053	142008	134253	27900	28800
2.	Krishnagiri	180175	180175	126935	126201	53240	53974
	Total	350083	343228	268943	260454	81140	82774
	Average / percentage	175041.5	171614	77	76	23	24

IRRIGATION METHOD FOR HORTICULTURE CROPS

Table : 2

Sl.No.	District	Area under well irrigation (Ha.)		River Irrigation (Ha.)		If well irrigation, area under Drip Irrigation (Ha)		Area by Flood Irrigation	
		2004–05	2005–06	2004–05	2005–06	2004–05	2005–06	2004–05	2005–06
1.	Dharmapuri	27900	28800	0	0	150	300	27750	28500
2.	Krishnagiri	53240	53974	–	–	452	630	0	0
	Total	**81140**	**82774**	**0**	**0**	**602**	**930**	**27750**	**28500**
	Average / Percentage	**40570**	**41387**	**0**	**0**	**–**	**–**	**34**	**34**

Part II DETAILS TO BE OBTAINED FROM FARMERS

CLASSIFICATION OF FARMERS BASED ON AGE, EDUCATIONAL QUALIFICATION

Table : 3

Sl.No.	District	SS	Below 25 Yrs (No.)	25-50 Years (No.)	Above 50 years (No.)	Illiterate (No.)	Primary (No.)	High school (No.)	College (No.)
1.	Dharmapuri	30	0	18	12	0	7	16	7
2.	Krishnagiri	30	0	17	13	6	12	8	4
	Total	**60**	**0**	**35**	**25**	**6**	**19**	**24**	**11**
	Average / Percentage	–	**0**	**58**	**42**	**10**	**32**	**40**	**18**

CLASSIFICATION OF FARMERS BASED ON LAND HOLDINGS, SOCIAL STATUS

Table : 4

Sl.No.	District	SS	MF (No.)	SF (No.)	BF (No.)	SC/ST (No.)	BC (No.)	Others (No.)	Ownland (No.)	Leased in (No.)
1.	Dharmapuri	30	1	9	20	2	28	0	30	0
2.	Krishnagiri	30	–	–	30	1	8	21	30	–
	Total	**60**	**1**	**9**	**50**	**3**	**36**	**21**	**60**	**0**
	Average / Percentage	**–**	**2**	**15**	**83**	**5**	**60**	**35**	**100**	**0**

CLASSIFICATION OF FARMERS BASED ON EXPERIENCE IN VEGETABLES CULTIVATED

Table : 5

Sl.No.	District	SS	Experience in Vegetable cultivable			Details of Vegetable Cultivated					
			5 years	5-10 years	> 10 years	Name of the Vegetable		Area Cultivate (Ha)		% of the area under vegetable to total area holding	
						2004-05	2005-06	2004-05	2005-06	2004-05	2005-06
1.	Dharmapuri	30	1	9	20	Tomato	Tomato	9.80	11.10	10%	11.70%
						Brinjal	Brinjal	0.40	2.90	0.4%	3%
						Kergins	Chillies	0.80	2.00	0.8%	2%
						Chillies	Bhendi	11.00	4.40	12.0%	5%
						Bhendi	Banana	0.60	3.10	0.6%	3%
						Banana	Raddish	0.80	1.50	0.8%	1.60%
						Raddish	Turmeric	1.00	5.60	9.5%	6%
						Turmeric	Tapioca	1.60	8.20	2%	9%
						Tapioca		9.60		10%	
2.	Krishnagiri	30	4	9	17	Tomato Cabbage Cauliflower Ahinaw Enopire NS66, NS 6 ON	Chillies Capsicum French beans, Cluster beans Lab Lab Brinjal Coriander Potato, Ribbed Gourd Snake gourd Bottle gourd Gherkin Rose,Onion Cucumber Beet root Golden rod China Aster Marigold Bomama	50Ha	100 Ha	10%	15%
	Total	60	5	18	37						
	Average / Percentage		8	30	62						

METHOD OF IRRIGATION

Table : 6

Sl.No.	District	SS	Well Irrigation				River irrigation				If well irrigation Bed system				Drip irrigation			
			No. of farmers adopted		Area (Ha)		No. of Farmers		Area (Ha)		No. of farmers adopted		Area (Ha)		No. of farmers adopted		Area (Ha)	
			04–05	05–06	04–05	05–06	04–05	05–06	04–05	05–06	04–05	05–06	04–05	05–06	04–05	05–06	04–05	05–06
1.	DHARMAPURI	30	30	30	35.6	41.7	0	0	0	0	23	3	21.2	3	16	29	14.4	14.7
2.	KRISHNAGIRI	30	16	14	100	100	–	–	–	–	–	–	–	–	16	14	100	100
	TOTAL	60	46	44	136	142	0	0	0	0	23	3	21.2	3	32	43	114	115
	Average / percentage		77	73	68	71	0	0	0	0	38	5	11	2	53	72	57	57

DETAILS ABOUT PRECISION FARMING

Table : 7

Sl.No.	District	SS	Have you followed precision farming		If yes, year of adoption		Details of vegetables cultivated in precision farming			
			Yes (No.)	No (No)	04-05	05-06	04-05		05-06	
							Name of the vegetable	Area (Ha)	Name of the vegetable	Area (Ha)
1.	Dharmapuri	30	30		14	16	Tomato	3	Tomato	4.50
							Chillies	10	Brinjal	1.90
									Chillies	2.00
									Bhendi	2.70
									Banana	2.10
									Raddish	1.00
									Tapioca	3.60
2.	Krishnagiri	30	30	–	30	30	Tomato Cabbage Cauliflower	50	Chillies, Capsicum, French Beans, Cluster Beans, Lab Lab, Brinjal, Coriander, Potato, Ribbed Gourd, Snake Gourd, Bottle Gourd, Gherkin, Rose onion, Cucumber, Beet root, Golden Rod, China Aster, Marigold, Bomama	100
	Total	60	60	0	44	46		63		117.80
	Average / Percentage		100	0	73	77				

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SOURCE OF AWARENESS OF PRECISION FARMING

Table : 8

Sl. No.	District	SS	Source		Technologies adopted in the precision farming				Area increased by precision farming			
			Dept.of Horti (No.)	Others (No.)	Technologies		No.of farmers adopted		Yes (No.)	Research	No (No.)	Reason
					04–05	05–06	04–05	05–06				
1.	Dharmapuri	30	8	22	**	**	16	30	30	By saving water, additional area was brought under cultivation, Drip irrigation		
2.	Krishnagiri	30	0	30	**	**	30	30	30 (3 Ha.)	40 to 100% yield increase		
	Total	60	8	52			45	60				
	Percentage / Average		13	87			77	100				

** 1. Hybrids of Tomato, Brinjal, Chillies, Bhendhi, Raddish were cultivated

2. Seedlings of Tomato, Brinjal, Chillies were obtained from ploy houses are supplied

3. Tissue culture banana planted

4. Fungicide treatment adopted for all vegetables as well as setts of tobacco, suckers of banana

5. Basal fertilizer super phosphate applied (750 Kgs / Ha) for all horticultural crops. Water soluble fertilizer Urea, 0:0:50, 19:19:19, 13:0:45, 11:61:0, 12:61:0 are applied 405 days interval as per the recommendation of university officials through drip system

6. Bio fertilizer applied, Biocides applied as per the recommendation

7. Need based plant protection measures followed as per the recommendation of university officials

*** 8. Remote sensing technology

9. Chisel plough

10. High-tech community nursery

11. Drip and fertigation

12. Growing crops and growing with the crop market support

DETAILS ABOUT YIELD INCREASE COST OF CULTIVATION, FERTILIZER APPLICATION IN PRECISION FARMING

Table : 9

Sl.No.	District	SS	Has yield increased			
			Yes (Nos.)	Reason	No. (Nos.)	Reason
1.	Dharmapuri	30	28	1.Need based technologies was followed 2. By applying fertilizer through drip irrigation the yield has increased two to four folds 3. Technical advices are given periodically by the team of university officials at the field	2	1. Due to the natural calamity (Flood) the yield was reduced 2. Aged seedling was supplied by the university
2.	Krishnagiri	30	30	Adopted key technologies	–	–
	Total	60	58	–	–	–
	Average	–	97	–	–	–

Table : 9 contd...

Sl.No.	District	SS	Has yield increased			
			Yes (Nos.)	Reason	No. (Nos.)	Reason
1.	Dharmapuri	30	22	1. Labour cost was reduced in terms of irrigation and fertigation 2. By free distribution in the expenditure has reduced 3. By drip method water directly irrigated at root zone hence weeds are grown meagre	8	1. More number of labour was required for h a r v e s t i n g practice 2. Liquid fertilizer cost are very high in second year onwards
2.	Krishnagiri	30	30	Adopted improved technologies	–	–
	Total	60	52		8	
	Average	–	87		13	

Table : 9 contd...

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Sl.No.	District	SS	Has yield increased			
			Yes (Nos.)	Reason	No. (Nos.)	Reason
1.	Dharmapuri	30	22	1. Need based fertigation 2. No wastage of fertilizer 3. The application time was considerably low 4. No need of human labour 5. Higher efficiency	0	Does not arise
2.	Krishnagiri	30	30	Less labour, Timely application of fertilizer in tune with the requirement of crops	–	–
	Total	60	60		0	
	Average	–	100		0	

BENEFITS OBTAINED OVER PRECISION FARMING

Table : 10

Sl.No.	District	SS	Benefits obtained
1.	Dharmapuri	30	1. Additional yield 2. The cost of cultivation had reduced 3. Adequate technology was given in the proper time 4. Additional area was brought under cultivation 5. Water was saved considerably 6. Technical advise given periodically at the field 7. The fertilizer was applied through drip system
2.	Krishnagiri	30	1. Cabbage and Cauliflower farmers achieved a yield of 60 tonnes / ha each 20 per cent increase as against 50 tonnes buy other farmers 2. In tomato 63 percentage of yield increase was achieved 3. In Chillies the yield increase was upto 95 per cent 4. 63% Economic benefit was benefit compared to farmers of conventional system empowerment

Table : 10 Contd..

Whether the Precision Farmers is Remunerative

Sl.No.	District	SS	Yes	Reason	No	Reason
1.	Dharmapuri	30	30	1. Additional yield was obtained 2. Easy maintenance 3.Cost of cultivation was reduced	0	Does not arise
2.	Krishnagiri	30	30	The gross income realised varied from 3-90 lakhs / Ha in tomato to Rs.1-72 lakhs in chilli of the four crops, tomato has given maximum gross income Rs.3-90 lakhs. The entire gross income could be considered net income for farmers in the production side 100% subsidy was provided	0	

ADOPTION OF PRECISION FARMING BY OTHER FARMERS

Table : 11

Sl.No.	District	SS	Have you convenyed about precision farming to other farmer		If yes, whether other farmers have adopted precision farming		If Yes			
			Yes (Nos.)	No (Nos.)	Yes (Nos.)	No (Nos.)	No. of farmers adopted (Nos.)		Area (ha)	
							2004 -05	2005-0-6	2004-05	2005 -06
1.	Dharma puri	30	30	0	30	0	0	30	0	30
2.	Krishnag iri	30	30	0	30	0	52	100	3	–
	Total	60	60	0	60	0	52	130	3	30
	Average / Percent age		100	0	100	0				

DETAILS ABOUT THE SUBSIDY GIVEN

Table : 12

Sl.No.	District	SS	Amount of subsidy availed		Subsidy given subsidy %	
			2004–05	2005–06	2004–05	2005–06
1.	Dharmapuri	30	16,10,000	1656000	100%	90%
2.	Krishnagiri	30	115000 / Ha 5750000 / 50 Ha	103500 / Ha 10350000 / 100 Ha	100%	90%
	Total	60				

OBSTACLES FACED AND CHANGES REQUIRED

Table: 13

Sl.No.	District	SS	Obstacles faced in adoption by precision farming	Nos.	Obstacles faced by precision farming
1.	Dharmapuri	30	1. Difficulty in marketing the produce 2. Additional expense in the second year 3. Blockage in drip units 4. Closer dripper	1 1 2 2	Already mentioned
	Total	60			

DETAILS OF CHANGES REQUIRED

Table: 14

Sl.No.	District	SS	Whether your need change		If yes, type of change needed
			Yes (Nos.)	No (Nos.)	
1.	Dharmapuri	30	10	0	1. Subsidy should be given for soluble fertilizer as in straight fertilizers 2. New technology is required for removing the blocks in the drip units 3. The technology advise is required continuously for the forthcoming year also 4. The scheme shall be given to more number of new farmers with 100% subsidy 5. More water saving technologies are required 6. The distance between every row must be adjustable
2.	Krishnagiri	30	–	–	–

Part III

Details obtained from farmers not following precision farming

Table : 15

Sl.No.	District	SS	Are you aware of precision farming		If yes source of awareness	
			Yes (Nos.)	No. (Nos.)	DOH (Nos.)	Others (Nos.)
1.	Dharmapuri	10	10	0	2	8
2.	Krishnagiri	10	10	0	0	10 (Tamil Nadu Agricultural University, Coimbatore – 3 (RRS, Paiyur)
	Total	20	20	0	2	18
	Average / Percentage				10	90

VISIT TO PRECISION FARMING

Table : 16

Sl.No.	District	SS	Have you seen the farmers under precision farming		If yes, are you interested in precision farm			
			Yes (Nos.)	No. (Nos.)	Yes (Nos.)	Reason	No. (Nos.)	Reason
1.	Dharma puri	10	10	0	10	1.Water saving 2. Less maintenance 3. High yield 4. Low cost of cultivation 5. Good water management , fertilizer management and appropriate P.P.measures taken 6.Timely technical advice 7. Higher profit 8. More area will be brought under cultivation 9. Input materials are available at higher subsidy	0	Does not arise
2.	Krishnag iri	10	10	0	10	Production was increased by 60% over the conventional practice and inputs saving by 20%	0	0
	Total	20	20	0	20		0	0
	Average / Percent age		100		100			

OPINION ABOUT THE PRECISION FARMING

Table : 17

Sl.No.	District	SS	Whether farming will be beneficial				Reasons for adopting precision farming
			Yes (No.)	Reason	No. (Nos.)	Reason	
1.	Dharmapuri	10	10	1.Water saving 2. Additional area will be brought under cultivation 3.Appropriate fertilizer application 4. Adequate P.P.chemicals application 5. Higher market price 6. Timely technical advice 7. Useful during drought 8. Higher yield 9. Good profit	0	Does not arise	1. Water saving 2. More area was brought under cultivation 3. Appropriate fertilizer and P.P.chemcial application 4. Usage of soluble fertilizer in adequate quantity 5. Good and timely technical advice 6. Higher yield 7. Higher profit
2.	Krishnagiri	10	10	63% economic benefit was evident compared to farmers of conventional system, empowerment of farmers forum	0	0	Subsidy percentage, Drip fertigation, High yield and more income
	Total	20	20				
	Average / Percentage		100				

PART IV

DETAILS OBTAINED FROM ASSISTANT DIRECTOR OF HORTICULTURE

Table : 18

Sl.No.	District	SS	From which year the precision farming is under operation in your district	Area under precision farming			
				Area (Ha.)		Beneficiaries (Nos.)	
				2004–05	2005–06	2004–05	2005–06
1.	Dharmapuri	1	2004–05	50	100	50	100
2.	Krishnagiri	1	2004–05	50	100	52	100
	Total	2	0	100	200	102	200

INTEREST OF THE FARMERS

Table : 19

Sl.No.	District	SS	Whether the farmers are interested in adopting precision farming				If yes area increased under vegetable / fruits by precision farming	
			Yes (Nos.)	Reason	No (Nos.)	Reason	Area (Ha)	
							2004–05	2005–06
1.	Dharmapuri	1	1	1.Increase in yield 2. Technical advice 3. Water saving	0	Does not arise	0	150
2.	Krishnagiri	1	1	Subsidy pattern, drip fertigation, high yield and more income	0	0	3	0
	Total	**2**	**2**					

DETAILS OF CROPS CULTIVATED UNDER PRECISION FARMING

Table : 20

Sl.No.	District	SS	Crops cultivated under precision farming			
			2004–05		2005–06	
			Crops	Area (Ha.)	Crops	Area (Ha.)
1.	Dharmapuri	1	Tomato Chillies	20 30	Tomato Brinjal Banana Tapioca Watermelon	100 ha (In total)
2.	Krishnagiri	1	Tomato Cabbage Cauliflower	500 Ha.	Chillies, Capsicum, French Beans, Cluster Beans, Lab Lab, Brinjal, Coriander, Potato, Ribbed gourd, Snake Gourd, Bottle Gourd, Gherkin, Rose, Onion, Cucumber, Beetroot, Golden rod, China Aster, Marigold, Bomama, Rose, Carrot	100 Ha

DETAILS OF TECHNOLOGIES ADOPTED IN PRECISION FARMING

Table : 21

Sl.No.	District	SS	Technologies Adopted
1.	Dharmapuri	1	1.Hybrids of Tomato, Brinjal, Chillies, Bhendi, Raddish were cultivated 2. Seedlings of tomato, brinjal, chillies were obtained from poly houses, are supplied 3. Tissue culture banana planted 4. Fungicide treatment adopted for all vegetable as well as setts of tobacco, suckers of banana 5. Basal fertilizer super phosphate applied (750 kg / Ha) for all horticultural crops. Water soluble fertilizer Urea, 0:0:50, 19:19:19, 13:0:45, 11:61:0, 12:61:0, are applied 4-5 days interval as per the recommendation of university officials through drip system 6. Bio fertilizer applied, biocides applied as per the recommendation 7. Need based plant protection measures followed as per the recommendation of university officials
2.	Krishnagiri	1	1. Remote sensing technology 2. Chisel plough 3. High-tech community nursery 4. Drip and fertigation 5. Growing crops and growing with the crop market support

OBSTACLES FACED DURING THE IMPLEMENTATION OF THE SCHEMES AND STEPS TAKEN TO OVERCOME

Table : 22

Sl.No.	District	SS	Yes	Obstacles faced in the implementation of the scheme	Steps taken to overcome the constraints
1.	Dharmapuri	1	1	1.The maintenance of dripper units 2. Fertigation through drips	1. Training on maintenance and management of drip units 2. Training for fertigation through drip units
2.	Krishnagiri	1	1	Nil	Nil
	Total	**2**	**1**		
	Average / percentage		**50**		

SUGGESTIONS FOR THE BETTER IMPLEMENTATION

Table : 23

Sl.No.	District	SS	Suggestions for better implementation of the scheme in future
1.	Dharmapuri	1	Since more number of farmers are willing and interested in adopting the precision farming system, the scheme may be operated in large area covering more number of farmers
2.	Krishnagiri	1	Farmers clusters – Formation of farmers federation on crop wise. Markets tie ups with companies dealing with retail business. Quality production on Export standard Development of common instruction facilities like cold storage, collection centre and transport facilities