Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

Dr. K Kumaresh
Assistant Professor, Department of Agricultural and Rural Management, JKK Munirajah College of Agricultural Science TN. Palayam, Gobichettipalayam, Tamil Nadu, India

Dr. R Ravikumar
Ph.D. Assistant Professor, Department of Humanities PSG Institute of Technology and Applied Research, Coimbatore, Tamil Nadu, India

Determinants of brand preference in drip irrigation system in Tamil Nadu

Dr. K Kumaresh and Dr. R Ravikumar

Abstract
The growing challenge for agricultural development is how to grow more food for growing population with less water share for agriculture. The government of India implemented subsidy schemes to encourage the farmers to adopt improved irrigation technologies. Brand preference has become pivotal point of differentiation in the market. This study would focus on determinants of brand preference by analyzing the data collected from 100 randomly selected farmers of Coimbatore district in Tamil Nadu, India, using Factor analysis, Logit regression and Garrett ranking analysis. Water saving was the most influencing factor for adoption of drip system. Immediate response by sales executives and market promotion were the major determinants of brand preference. Awareness adoption ratio of subsurface drip and inline drip system was 1:0.50 and 1:0.72 respectively.

Keywords: Brand preference, drip irrigation system, awareness, adoption and factor analysis

1. Introduction
In recent days, the farmers are facing ever increasing cost of inputs and diminishing resources resulted in adoption of technologies which are helpful in achieving efficiency in irrigation water, energy and soil nutrients. Land and water are indispensable resources for agricultural production and these resources should be judiciously managed for economic development of farming community. The progressive urbanization coupled with industrialization has resulted in reduced per capita availability of land and water. The large scale exploitation and indiscriminate use of water resources is common problem across the country. Hence it is high time to adoption of resource conserving technologies for efficient utilization of land and water along with improved management practices has become mandatory.

Even though, it was introduced in 1970's the area under drip irrigation was around 1500 hectares until 1985 and later it was increased to 6000 hectares in 1988 followed by in 1993 66,000 hectares, which was less than one per cent of the total area under irrigation (Saksena, 2002) [12]. In 2008-09, the area covered under Micro Irrigation was around 5.5 lakes hectares (www.Indiastat.com); though the drip system gives more resource saving and economic benefits compared to traditional methods, the area brought under micro irrigation is very meager to the total irrigated area. Keeping this in view the government of India has introduced subsidy scheme to help the adaptors from high initial capital costs. The rate of subsidy recommended by the government of India is 75 per cent of the cost to marginal (less than one hectare) and small farmers (1.00 to 1.99 hectares), 40 to 50 per cent of the cost to semi-medium (2.00 to 3.99 hectares), medium (4.00 to 9.99 hectares) and large farmers (more than 10 hectares of land), 90 per cent of the cost to marginal and small farmers belonging to women, SC and ST farmers.

The reduced availability of the water and the government intention to promote judicious use of irrigation water through various subsidy schemes leads the micro irrigation industry in to growth phase. Under this condition the company's which markets drip irrigation products were having good scope and also facing tough competition in the industry. So the companies should give special attention on farmers' expectations and their preferences on drip irrigation systems. In this context, a study was undertaken with an overall objective of analyze the farmers' expectations and their brand preferences towards drip irrigation systems.

2. Review of literature
The American Marketing Association (1994) [3] defines a brand as a "name, term, sign, symbol or design, or a combination of them intended to encourage prospective customers to differentiate a producer's product (s) from those of competitors".
Chimboza and Mutandwa (2007) [5] estimated that promotion, brand price and availability, brand packaging and brand quality were the determinants of brand preference in a dairy

Correspondence
Dr. K Kumaresh
Assistant Professor, Department of Agricultural and Rural Management, JKK Munirajah College of Agricultural Science TN. Palayam, Gobichettipalayam, Tamil Nadu, India

product market out of which they find that promotion was the most important factor which determine the brand preference.

Prestige effect of foreign brands, Patriotism and trust or Performance effect of Chinese brands were the important factors which determine the brand preference of the Chinese customers towards foreign brands (Matthias Schramm and Torsten Staack,) Advertising has a major influence on consumers' brand preference. Adeolu *et al* (2005) [2] have studied that 38.73 per cent of the consumers showed preference for Bournvita out of the various brands of the food drink studied. The major reasons advanced for the preference are its captivating advertising (42.62 per cent) and rich quality (40.16 per cent). Anand and Krishna (2008) [4] studied the sample of 354 customers to determine rural brand preference in India using multiple regression analysis. This study shows that preference for FMCG brand in rural India is being significantly determined by good quality, value for money and recommended by my kind of people. Better finish and good looks, information through the shop keepers and warranty for unbranded products were the determinants of brand preference in consumer durables and the preference for an agro input brand in rural India is being determined only by value for money.

3. Objectives of the study
- To study the awareness and adoption level of advanced technologies in drip irrigation systems.
- To identify the factors influencing the adoption of drip irrigation systems.
- To analyze the determinants of brand preference in drip irrigation systems.

4. Research methodology
For this study 100 farmers were selected randomly from the five blocks of Coimbatore district in Tamil Nadu, India namely Annur, Avinashi, Thondamuthur, Palladam, and Udumalpet. The primary data were collected through personal interview method with the help of comprehensive pre-tested interview schedule. The collected data were tabulated and analyzed using Percentage analysis, Garrett ranking, Multi-dimensional scaling technique, Logit regression and Factor analysis.

5. Results and discussions
5.1 Demographic details of the sample farmers
The demographic details of the sample farmers were presented in the table 1 shows that most of the farmers were large farmers (46 per cent) coming under the age group of 36 to 45 years, completed high school level of education (40 per cent), doing agriculture (64 per cent) as the main occupation with more than 15 years of experience (37 per cent).

Table 1: Demographic characteristics

Particulars	Characteristics	Number of respondents (N)	
		Total N=100	In (%)
Age(Years)	25-35	9	9.00
	36-45	46	46.00
	46-55	26	26.00
	> 55	19	19.00
Education	Illiterate	10	10.00
	Primary	10	10.00
	High school	40	40.00
	Higher secondary	18	18.00
	Graduate	22	22.00
Occupation	Agriculture only	64	64.00
	Agriculture and Business	24	24.00
	Agriculture and Private job	5	5.00
	Agriculture and Government job	7	7.00
Farming Experience (Years)	<5	4	4.00
	5-10	26	26.00
	11-15	33	33.00
	>15	37	37.00
Size of land holding (ac)	Up to 2.50 (marginal)	6	6.00
	2.50-5.00 (small)	19	19.00
	5.01-10.00 (medium)	29	29.00
	> 10.00 (large)	46	46.00

5.2 Source of information
Source of information plays a critical role in the purchase of drip irrigation systems and also influence the brand preference. It could be observed from the Table 2 that private dealers (37 per cent) were the major source of information, followed by friends and relatives (20 per cent), company representative (17 per cent), department of agriculture and agricultural university (10 per cent), and finally the sugar factory extension workers (3.33 per cent) and others contributed 9 per cent. These results indicated that private dealers were the major source of information for the farmers.

Table 2: Source of information on the drip irrigation system (n=100)

S. NO	Source of information	Number of farmers	Percentage to total
1	Department of Agriculture/TNAU	10	10.00
2	Company representative	17	17.00
3	Private dealer	37	37.00
4	Friends and relatives	20	20.00
5	Sugar factory extension workers	7	7.00
6	Others	9	9.00
	Total	100	100.00

5.3 Awareness level on advanced technologies of drip irrigation systems

Awareness indicates the familiarity and popularity of the product among the farmers. The details of the number of farmers who were aware of advanced technologies of drip irrigation systems are presented in Table 3. From the Table 3 it could be observed that 46 per cent of the farmers were aware of subsurface irrigation technology and only 66 per cent of the farmers were aware of inline drip system and 55 per cent of the farmers were aware of automation technology. This indicates a huge scope for these technologies by creating awareness through proper marketing initiatives.

Table 3: Awareness level on advanced technologies of drip irrigation systems

Technology	Awareness level (%) (N=100)		
	Subsurface drip	Inline	Automation
Aware	46	66	55
Unaware	54	34	45
Total	100	100	100

5.4 Awareness level on advanced technologies of drip irrigation system in different blocks

From the Table 4 it could be observed that awareness level of subsurface drip system was highest in Avinashi block (12 per cent) followed by Thondamuthur and Udumalpet. Regarding inline drip system the awareness was highest (17 per cent) in Avinashi block followed by Palladam and Thondamuthur (14 per cent). In case of automation awareness was highest in Avinashi (14 per cent) block followed by Palladam (12 per cent) and Thondamuthur (11 per cent) blocks.

Table 4: Awareness level in different blocks (N=100)

Blocks	Awareness Level (%)		
	Subsurface drip	Inline	Automation
Annur	5	10	9
Avinashi	12	17	14
Palladam	8	14	12
Thondamuthur	11	14	11
Udumalpet	10	11	9
Total	46	66	55

5.5 Awareness to adoption ratio of different drip irrigation technologies

Table 5 shows the awareness to adoption ratio of subsurface drip system, inline and automation in drip system among the sample farmers. From the table 5 it could be concluded that awareness to adoption ratio of subsurface drip system was highest in Udumalpet and Annur block (1:0.60) followed by Thondamuthur (1:0.54) and Palladam (1:0.50) and it was lowest (1:0.33) in Avinashi block. The awareness to adoption ratio of inline drip system was highest in Avinashi block (1:0.88) followed by Palladam and Thondamuthur blocks (1:0.71). Awareness to adoption ratio was lowest (1:0.60) in Annur block. The awareness to adoption ratio of automation technology was 1:0 in all the blocks because no one in the study area adopted automation in drip irrigation system.

Table 5: Awareness to adoption ratio

Blocks	Awareness to adoption ratio		
	Subsurface drip	Inline	Automation
Annur	1:0.60	1:0.60	1:00
Avinashi	1:0.33	1:0.88	1:00
Palladam	1:0.50	1:0.71	1:00
Thondamuthur	1:0.54	1:0.71	1:00
Udumalpet	1:0.60	1:0.63	1:00
Overall	1:0.50	1:0.72	1:00

5.6 Factors influencing the adoption of drip irrigation technologies

The Logit model was used to identify the demographic factors which influenced the adoption of drip irrigation technologies and the maximum likelihood technique was used for the estimation. From the table 6 it could be observed that education and type of crop cultivated by the farmer were significantly and positively influenced the adoption of subsurface drip system. The distance between farms and nearest dealer was significantly and negatively influenced the adoption of subsurface drip system. From the modal summary -2 Log likelihood was got as 69.13 which indicated that the model is good fit because higher the value of -2 Log likelihood better the model fit. From the results of logistic regression analysis it could be inferred that with one unit increase in educational status of the farmer, the probability of adoption of was increased by 53 per cent. The change in type of crop cultivated by the farmer from annual to perennial would increase the adoption level up to 64 per cent. If one unit increase in the distance between farms and nearest dealer, the probability of adoption would reduce by 54 per cent.

Table 6: Factors influencing the adoption of drip irrigation technologies

Variables	Estimated Coefficient	T-Ratio	Odds ratio	Probability
Age (Years)	0.046	1.138	1.047	0.51
Education (Years)	0.122	2.051*	1.129	0.53
Farming experience (Years)	-0.045	-1.092	0.956	0.49
Size of land holding (Acres)	0.013	0.388	1.014	0.50
Distance between farm and dealer (Km)	-0.180	-1.985	1.197	0.54
Occupational status of farmers	0.250	0.503	1.284	0.56
Amount of Rain fall (mm)	0.003	0.907	1.003	0.50
Type of crop cultivated	0.590	1.944**	1.803	0.64

-2 log likelihood 69.13 (Note: *** 1%, ** 5% and * 10% level of significance)

5.7 Reason for purchase of drip irrigation system
The major factors influencing the purchase of drip irrigation system in the study area were collected, analyzed and the results are furnished in Table 7. Among the various factors identified, water saving was the most influencing factor (72.29) for the adoption of drip irrigation system followed by labour cost reduction with a mean score of 63.79, followed by observing success in neighbour field and increase in yield with the mean score of 49.30 and 48.24 respectively. Large farm area operation was a moderate influencing reason with the mean score of 45.46, followed by availability of subsidy and possibility of fertigation were the lowest influencing factors with the mean score of 36.79 and 35.14 respectively.

Table 7: Reason for purchase of drip irrigation system

S. No	Reasons	Score	Rank
1.	Water saving	72.29	I
2.	Labour cost reduction	63.79	II
3.	By observing success in neighbour field	49.30	III
4.	Increase in yield	48.24	IV
5.	Large farm size	45.46	V
6.	Availability of subsidy	36.79	VI
7.	Fertigation possibility	35.14	VII

5.8 Determinants of brand preference in drip irrigation system
The major factors determining the preference of a particular brand of drip irrigation system in the study area were collected, analyzed and the results are furnished in Table.8 and 9.

Table 8: Total Variance Explained

Component	Initial Eigen values		
	Total	% of Variance	Cumulative %
1	2.311	19.257	19.257
2	1.815	15.121	34.378
3	1.585	13.209	47.587
4	1.148	9.566	57.153
5	1.121	9.339	66.492
6	.922	7.684	74.176
7	.836	6.969	81.145
8	.731	6.089	87.234
9	.638	5.317	92.551
10	.483	4.027	96.578
11	.404	3.367	99.945
12	.007	.055	100.000

(Extraction Method: Principal Component Analysis.)

Table 9: Rotated Component Matrix

Variables	Components					communalities
	1	2	3	4	5	h^2
Price	-0.813	0.053	0.099	-0.034	0.209	0.718
Proper design	0.010	-0.104	0.376	0.560	0.353	0.591
Brand image	-0.165	0.622	-0.353	0.102	0.028	0.550
Good quality materials	0.739	-0.126	-0.351	0.146	0.127	0.723
Proper after sales service	0.520	0.172	0.238	0.043	0.450	0.562
Guarantee period	0.315	-0.109	0.015	0.562	0.153	0.450
Peer group influence	0.087	-0.174	0.024	-0.793	0.257	0.733
Local manufacturing facility	-0.636	0.014	-0.438	0.041	-0.117	0.612
Market promotion	-0.107	-0.117	0.870	0.131	-0.134	0.817
Easy approachability of sales force	0.051	0.711	-0.140	-0.371	-0.176	0.696
Recommended by Government	0.005	-0.752	-0.191	-0.152	-0.251	0.688
Immediate response	0.019	-0.064	0.173	-0.001	-0.898	0.841
Variance Explained	19.25	15.12	13.20	9.56	9.33	66.50 (Total)

5.9 Factor analysis
Factor analysis is a multivariate statistical technique used to reduce the large number of variables in to smaller number of variables called factors or components. The 12 variables have been reduced into five factors based on component matrix, Eigen values and communalities. From the table 8 it could be observed that first five components explained 66.49 percent of the variability in the original twelve variables. So we can reduce the original data in to five factors (Eigen values greater than one) with minimum loss of information (33.6%).

5.10 Rotated component matrix
The factors are rotated with the Varma Kaiser Normalization rotation method. We have used principal component analysis method for factor extraction and considered only those factors whose values more than 0.50 for the purpose of interpretation. From the table 9 it shows that Factor 1 explained about 19.25 percent of total variation and heavily loads on price, good quality materials, local manufacturing facility and proper after sales service. The factor 2 explained about 15.12 percent of the total variation and this factor loads heavily on recommended by government, easy approachability of the sales force and brand image. The variable market promotion have high loading on Factor 3 and it explained about 13.20 percent of the total variation. From the table we find variables

like peer group influence, guarantee period and proper design have high loading on Factor 4 and this explained about 9.56 percent of the total variation. Factor 5 explained about 9.33 percent of the total variance and this factor heavily loads on the variable immediate response.

6. Conclusion
The study concluded that most of the farmers were large farmers (46 per cent) coming under the age group of 36 to 45 years (46 per cent), completed high school level of education (40 per cent), doing agriculture only (64 per cent) as the main occupation with more than 15 years of experience (37 per cent). Private dealers were the major source of information to the farmers. So the companies should maintain good relationship with the dealers to improve their brand image among the farmers. Forty six per cent of the farmers were aware about subsurface drip technology and only 66 and 55 per cent of the farmers were aware about the inline drip system and automation technology respectively and none of the farmer has adopted automation in their drip system. The drip marketing companies should increase the awareness level of subsurface drip system, inline drip system and automation technology among the farmers to improve their brand image and market share. Water saving and labour cost reduction were the most influencing factors for the adoption of drip

irrigation system among the farmers. So the drip marketing companies must concentrate the areas where the water scarcity and labour shortage was the major problem. Immediate response by sales executives, market promotion, peer group influence, quality of materials and price were the major determinants of brand preference of farmers.

7. References

1. Adeogun OA, AM Ajana, OA Ayinla, MT Yarhere, MO Adeogun. Application of Logit Model in Adoption Decision: A Study of Hybrid Clarias in Lagos State, Nigeria. American-Eurasian Journal of Agriculture and Environmental Science. 2008; 4(4):468-472.
2. *Adeolu B Ayanwale, Taiwo Alimi, Matthew A Ayanbimipe. The influence of advertising on consumer brand preference, Journal of Social Science. 2005; 10(1):9-16.*
3. American Marketing Association. Marketing Definitions. A Glossary of Marketing Terms. 1994; 9:1960.
4. Anand Sandip, Rajneesh Krishna. Rural Brand Preference Determinants in India. Conference on "Marketing to Rural Consumers–Understanding and Tapping the Rural Market Potential, 2008.
5. Chimboza, Denford, Edward Mutandwa. Measuring the determinants of brand preference in a dairy product market. African Journal of Business Management. 2007; 1(9):230-237.
6. Cunningham WV, Maloney WF. Heterogeneity among Mexico's micro-enterprises: An application of factor and cluster analysis, University of Illinois Publications, 7-8
7. INCID. Drip Irrigation in India, Indian National Committee on Irrigation and Drainage, New Delhi, 1994.
8. INCID. Sprinkler Irrigation in India, Indian National Committee on Irrigation and Drainage, New Delhi, 1998.
9. Matthias Schramm, Torsten Staack. Evolving Brand Preferences. The Case of China An empirical analysis, 1998, 1-18.
10. Norusis MJ. SPSS Introductory Statistics Students Guide. SPSS International BV, the Netherlands, 1990, 321-341.
11. Paul E green, Arun Maheshwari, vithala R Rao. Selfconcept and brand preference: An empirical application of multidimensional scaling. Journal of market research society. 1969; 11(4):343-360.
12. Saksena RS. Drip irrigation in India- Status and Issues. Lead Bank Journal, 2002; 30(13):1-10.
13. Sivanappan, R.K. (1994). Prospects of Micro-irrigation in India. Irrigation and Drainage Systems. 2002; 8:49-58.