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Management Characteristics and Adoption Index of Indigenous Agricultural Practices by Rice Farmers

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ABSTRACT

The study was conducted in Vellore district of Tamil Nadu, to assess the relationship between Management characteristics of farmers and their adoption of Indigenous Agricultural Practices (IAPs) in Rice cultivation. One hundred and twenty Rice growing farmers were purposively selected from five blocks of Vellore district for the study. Thirty eight IAPs for Rice cultivation as listed in Tamil Nadu Agricultural University Agritech portal were selected for the study and the adoption index regarding these technologies revealed that majority (65%) of the respondents had 'medium' adoption index. With regard to the management characteristics studied, majority of the respondents had medium level of management orientation (75.00%), coordination ability (70.80%), risk orientation (75.80%), self-confidence (69.20%) and self-reliability (56.70%). The study also revealed that there was a positive and significant relationship with regard to self-confidence and self-reliance of the farmers with the extent of adoption of Indigenous Agricultural Practices. Risk orientation had a negative but significant relationship with extent of adoption. Training the farmers to improve their management skills could lead to better adoption of the indigenous practices.

In recent years, sustainability issues have infused sanity in utilising interventions without much damage to the environment. The need for organic agriculture and use of eco-friendly technologies to increase productivity in order to feed the increasing population is the results of such thoughts. Recently, accepting the wisdom of the practitioners of agriculture in overcoming the location specific problems is gaining momentum and researches have aimed at documenting, rationalising, and blending the Indigenous Knowledge with the so called Scientific or Western knowledge so as to take care of the sustainability issues. Indigenous knowledge (IK) is the sum total of knowledge and practices that are based on people's accumulated experience in dealing with situations and problems in various aspects of life and such knowledge and practices are special for a particular culture.

Many of the indigenous technologies are not so popular and many times are confined to the knowledge of few, presently called innovative organic farmers or age old traditional farmers. Hence, this indigenous wisdom of the farmers should be documented, pooled and rationalized so that they could be popularized. However after such popularization, adoption of a practice is dependent on many characteristics including

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attributes of the innovation or practice and the socio-personal / economic characters of the adopter. Moreover it is also dependent on the management characteristics, like planning, production and marketing capacity of the farmers. The characteristics like confidence on the part of the farmers in farming, their ability to coordinate different functions related to farming and confidence in their own abilities also plays a vital role in adopting various practices. Keeping this in mind, the study was conducted with the following specific objectives:

1. To study the Management Characteristics of Rice farmers.
2. To study the adoption of Indigenous Agricultural Practices among the Rice farmers.
3. To study the relationship between the selected Management characteristics and adoption of Indigenous Agricultural Practices among the Rice farmers.

METHODOLOGY

The present study was carried out in Vellore district of Tamil Nadu state. Rice growing farmers of Arakkonam, Kaveripakkam, Nemili, Sholingur and Thimiri blocks were selected for the study. These blocks were purposively selected because of their large area under Rice cultivation. Out of the 233 villages in these five blocks, thirty villages were selected based on their large area under rice cultivation, at a rate of six villages per block. From these villages, hundred and twenty aged and experienced farmers were interviewed, at a rate of four farmers per village. Snowballing method was used to select these farmers.

Generally, early selection of crops and assessing the seed and fertilizer requirements well in advance, use of soil testing for assessing fertilizer requirements, getting the advice of an expert in problems related to crop cultivation, realizing the importance of grading and usage of warehouses for getting better profit are considered as better management practices. The risk taking ability of a farmer also decides his adoption of newer practices to get better returns. The confidence a farmer has in oneself and the practices that he adopts and his ability to adjust to difficult situations have an impact on his adoption of a particular practice and also indirectly decides on his attitude to borrowing money for farming activities. All these qualities of a farmer put together is called his management characteristics. Management characteristics of the respondents were studied based on the following five qualities possessed by the respondents:

1. Management Orientation - Management Orientation refers to the degree to which a farmer is oriented towards scientific farm management comprising of planning, production and marketing functions of his farm. Higher score reveals a favourable management outlook of the respondent.
2. Coordination Ability - The ability to co-ordinate farm activities is the degree to

which an individual co-ordinates actions in a time dimension.

3. Risk Orientation - Risk orientation refers to the degree to which a farmer is oriented towards risk and uncertainty and has courage to face the problems in farming.

4. Self-Confidence - Self-confidence indicates the extent of feeling of one's own ability and resourcefulness in carrying out any activity which an individual desired to undertake.

5. Self-Reliance-Self-reliance is conceptually related to credit orientation and planning orientation. Borrowing capital for introducing changes in farming and to do it in a planned way, pre-supposes confidence in oneself along with the realization that all environmental factors are not inscrutable supernatural forces beyond our control.

The Indigenous Agricultural Practices for Rice that were documented in the Tamil Nadu Agricultural University website (http://agritech.tnau.ac.in/) were enlisted and were used for making the interview schedule.

Adoption is defined as the decision to make full use of a new idea as the best course of action available. In this study adoption was operationalized as whether the respondent had ever practiced each of the selected Indigenous Agricultural Practices. The selected Indigenous Agricultural Practices were explained to the respondents one by one enquiring whether they had adopted the practice. Positive responses were assigned a score of 1 and negative responses were assigned a score of 0. The scores obtained for all the practices were summed up for each respondent and the adoption score was arrived at. The adoption index for each respondent was worked out by using the following formula as used by Sundaramari (2001) and Sakeer Husain (2010).

FINDINGS AND DISCUSSION

$$\text{Adoption index} = \frac{\text{Number of Indigenous Practices adopted}}{\text{Number of Indigenous practices applicable}} \times 100$$

Management Characteristics of the Rice Farmers

Majority (75%) of the respondents was in the medium category with regard to Management orientation. The management orientation includes planning, production and marketing function of the respondents. Majority of the respondents would not have planned afresh about the crops to be cultivated in each type of land every year. Similarly, majority of them would have selected the crops based on the availability of the rain and did not think that increased yield could be obtained through preplanning.

With regard to production functions, generally nutrient management based on soil test and determination of seed rate and other production related decisions through consultation with a crop specialist was not

Table 1.
Inventory of Indigenous Agricultural Practices in Rice Cultivation

Sl.No.	Indigenous Agricultural Practices
1	Good harvest can be obtained from the crop transplanted during *Aavani* i.e. Aug. - Sep.
2	Sowing on eighteenth day (*Aadiperukku*) of Tamil month *Aadi* (July-Aug.) ensures good harvest.
3	Daincha seeds are sown on paddy main fields when paddy nursery is raised and as they grow up Daincha is ploughed in-situ during field preparation.
4	Use large mud pots called *Kudhir* as high as six feet for storing Paddy grains for longer periods.
5	The crop transplanted during October-November will give reduced yield.
6	Neem oil is mixed with water @ 30 ml/lit. and sprayed to control Stem Borer in Rice.
7	Neem (*AzadirachtaIndica*) oil cake extract is sprayed to control Thrips in Rice.
8	120 grains found in a Rice ear head indicates the full yield.
9	Mixing the Paddy grains with the leaves of Pungam (*P.pinnata*) or Notchi (*Vitex negundo*) or Neem before storage to avoid storage pest attack.
10	Apply the Neem seeds @ 40Kg/ ac as basal to get more yield as compared to the equal quantity of Neem cake.
11	Plough the main field for four to six times for better yield.
12	'T' shaped bamboo stands are placed in many places in the Paddy fields so that birds can sit on them and feed on the larvae and adults of rice pests.
13	Irrigate the field, allow the weed seeds to germinate and then plough the fields to incorporate the weeds into the soil before sowing or transplanting of rice crop to control weed growth.
14	Planting the *Samba* (Aug.), crop thickly and *Navarai* (Feb.) thinly.
15	The Rice crop will establish better if it is transplanted along the wind direction.
16	When one earhead contains about 100 grains, the yield will be 20-22 quintals /ac.
17	Putting the leaves of *Nochi* (*Vitex negundo*) and *Pungam* (*Pongamia pinnata*) inside the *Kulumai* to ward off storage pests.
18	Cultivation of Sunhemp or Daincha helps to control the nut grass.
19	Practice sheep penning during summer to get more yield
20	Applying Neem cake before last plough to control root rot and nematode problem.
21	Palmyra (*Borassus flabellifer*) fronds are tied on to poles and kept on the corner of rice fields so that the noise produced by them scare away the birds like ducks, sparrows etc, and save the grains being damaged.

Table 1. contd. . .

Sl.No.	Indigenous Agricultural Practices
22	Practice sheep penning for the first season and green leaf manure for the second season for better yield.
23	Application of *Calotropis* as green leaf manure will prevent Thrips attack in the nursery.
24	Soaking the Paddy seeds in diluted cow's urine before sowing considerably reduces the incidences of Leaf Spot and Rice Blast.
25	Treatment of Paddy seeds in diluted bio gas slurry for 12 hrs increases resistance of seedlings to pest and diseases.
26	Dusting *Chulah* ash in the early morning to control Stem Borer and Ear Head Bugs.
27	Spraying the leaf extract of *Adaathoda vasica* to control Rice Tungro.
28	A mixture of 5Kg of common salt and 15Kg of sand is applied for 1 acre to control Brown Spot Disease.
29	About 30 Kg of Tamarind seeds are applied for an acre of Paddy field one day after transplanting to boost up the crop growth and yield.
30	Apply 100 kg of Pig manure for one acre of rice at 10 days after planting to get higher yield.
31	Growing or planting *Calotropis* at 12 feet interval on all sides of Paddy fields to control the Leaf Roller.
32	For control of Red Leaf Spot disease in Paddy, the seeds are soaked in *Pudhina* leaf extract for 24 hrs.
33	Hundred ml of leaf extract of *Karuvel* (*Acacia nilotica*) and 10Kg of Cow dung are dissolved in 10lit. of water and sprayed on the rice crop to control Ear Head Bugs.
34	During panicle formation in Paddy, the flowers of C*ycas circinalis* are placed on sticks in Paddy fields @ 4/ac. Its unpleasant odour repels Ear Head Bugs.
35	Presoaking of Paddy seeds in milk increases its resistance against "tungro" virus and 'stunt' virus.
36	To control Ear Head Bugs, 10 Kg of Cow dung ash is mixed with 2Kg of powdered Tobacco waste and dusted on the rice crop during morning hours.
37	Dragging the branches of country Ber or Aloe sp. on the affected field to control the Leaf Roller.
38	Soaking the Paddy seeds in the 20% *Mint* leaves solution before sowing will control the Leaf Spot

on the agenda of a majority of the respondents. Similarly in the case of marketing function, respondents were not much aware about the grading and the use of warehouses to get better prices for their produce. Many of the respondents had not

grown their crops based on market demand. Hence, the mean score for management orientation was found to be 38.43 out of a maximum of 54.

The distribution of respondents based on their coordination ability indicated that majority (70.8%) of the respondents had 'medium' coordination ability. The mean score for Coordination ability was found to be 6.42 out of a maximum score of 10 since many of the respondents usually did not make arrangements for the farming expenses well in advance and also for purchasing fertilisers and seeds well in advance.

Majority (75.8%) of the respondents were under the 'medium' category in risk orientation. As many of the respondents were contented with the smaller profits instead of making a larger profit by taking risk they were scared to take up new methods of farming as it involved greater risk. The mean score for Risk orientation was found to be 13.3 out of a total score of 18, which indicates that majority of the respondents had above average risk orientation ability.

In the case of self-confidence, 69.20 per cent of the respondents were under 'medium' category. Respondents were tested about their confidence level by understanding their faith in themselves, ability to adjust to new situations and the ability to face difficult situations without worry. The mean score for Self confidence was found to be 5.83 out of a maximum of 9. This shows that majority of the respondents had a score above average level. This may be due to the reason that the study was conducted in a traditionally rice growing area and majority of the respondents had been cultivating rice for a long period of time and had confidence over their abilities with regard to rice farming.

The self-reliance of the respondents revealed that 56.7 per cent of them had medium level of self-reliance. The average self-reliance score of the respondents was 2.81 and it was indicative of their 'medium' self-reliance which might be due to the fact that the farmers are still adopting a considerable number of indigenous practices with much reliance on the local inputs though a large number of modern technologies have been introduced in rice farming.

Adoption of Indigenous Agricultural Practices on Rice

The studies on the adoption of the 38 Indigenous Agricultural Practices revealed that majority (65%) of the respondents had 'medium' level of adoption index, followed by 18.33 per cent of the respondents who had 'high' level of adoption index.

The sixteen IAPs numbering 1, 2, 3, 5, 8, 10, 11, 13, 14, 15, 16, 18, 19, 22, 29 and 30 were related to crop production technologies. The nineteen IAPSs numbering 6, 7, 12, 20, 21, 23, 24, 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, 37 and 38 were crop protection technologies.

The possible reason for the medium level of adoption by majority of the respondents might be due to the fact that agriculture today is market oriented. The dependence on market

either for the purchase of inputs or for marketing of produces combined with the neighbourhood's influence on adoption of practices would have invariably pushed the farmers to go in for readymade inputs which are easily available and less laborious as compared to the indigenous practices.

The introduction and popularization of modern chemical methods of pest and disease control by various extension agencies doubled with the readymade availability, less bulkiness and less laborious nature of these chemical methods possibly made these methods more popular among the farmers as compared to the Indigenous practices. This was found to be in accordance with the findings of Venkatesan and Sundaramari (2012).

Three IAPs namely 4, 9 and 17 were related to storage. The medium level of adoption of these practices might possibly be due to the reason that presently the farms are mostly fragmented and even those farmers who have a considerable area under rice cultivation do not store their grains either for consumption or for seed. Fresh Paddy seeds are bought every season for cultivation and changes in dietary preference had made farmers sell their produce and purchase super fine rice varieties for consumption.

Relationship between the selected management characteristics of the farmers and their extent of adoption of Indigenous practices

The relationship between the selected management characteristics like Management orientation (X_1), Co-ordination ability (X_2), Risk orientation (X_3), Self-confidence (X_4) and Self-Reliance (X_5) and the extent of adoption of the indigenous agricultural practices were correlated using the Pearson coefficient of correlation.

The management characteristics like Management orientation, Coordination ability, Self-confidence and Self-reliance had a positive relationship with the adoption of Indigenous Agricultural Practices. Of these,

Table 2.
Relationship between the Selected Management Characteristics of the Farmers and Their Extent of Adoption of Indigenous Practices

Sl. No.	Management characteristics	Correlation coefficient (r)	p value
1.	Management orientation (X_1)	0.122	0.184
2.	Co-ordination ability (X_2)	0.012	0.897
3.	Risk orientation (X_3)	- 0.223*	0.014*
4.	Self-confidence (X_4)	0.216*	0.018*
5.	Self-Reliance (X_5)	0.282**	0.002**

* Significant at the 0.05 level
** Significant at the 0.01 level

Self-confidence and Self-reliance had a significant relationship with the extent of adoption with 21 per cent and 28 per cent positive relationship. This significant relationship might be due to the fact that majority of the respondents had the confidence in themselves and a good number of indigenous practices they followed due to their long association with rice farming. The positive relationship between these management characteristics and adoption index of Indigenous Agricultural Practices could be utilized to increase the adoption percentage of indigenous practices.

The management characteristic, Risk orientation had 22 per cent negative and significant relationship with the adoption of Indigenous Agricultural Practices. Usually, indigenous agricultural practices pose less risk as compared to the modern practices. Hence, the farmers who wish to face less risk would like to adopt more number of indigenous practices and vice-versa.

CONCLUSION

Rice is presently being cultivated through a blend of modern chemical practices and indigenous practices. This is revealed by the study that majority (65%) of the respondents (Rice cultivating farmers) had medium adoption index with regard to adoption of Indigenous Agricultural Practices. The management characteristics like Management orientation and Co-ordination ability had a positive relationship while Self-confidence and Self-reliance had a positive and significant relationship with the adoption index of Indigenous Agricultural Practices. As the risk orientation had a negative and significant relationship with extent of adoption of indigenous practices, farmers need to be educated about the sustainable nature of the indigenous practices which would be beneficial in a long run. The indigenous practices are perceived to be culturally compatible, safe, simple, cost effective and sustainable. Hence, efforts need to be taken to popularize these practices. The farmers need to be trained to improve their management skills so that the positive relationship could be exploited for better adoption of the indigenous practices.

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