SUMMARY
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Home-makers particularly in rural areas encounter increasing shortage of energy for cooking they were otherwise resorting to. With the introduction of bio-gas as a technology recommended for cooking, the problem of increased shortage of wood and improper use of dung has considerably been reduced and it is in this context bio-gas has been realised as significant innovation came to the rescue of farming community. However, satisfactory performance in terms of proper functioning is a matter of great concern to all those who are directly or indirectly coming in contact with bio-gas. Present study is an attempt to take a stalk of its performance as perceived and reported by its users contacted as a respondents together with utility reported and attitude expressed. Specific objectives however, are given below-

1. To understand personal, social, economic and situational characteristics of the respondents.

2. To get acquainted with the performance appraisal of bio-gas under use as reported by the respondents.

3. To understand utility perceived and reported by the respondents.

4. To find out attitude of the respondents towards bio-gas as an innovation.

5. To know time utilisation pattern, money spent and energy required in the utilisation of bio-gas as reported by the respondents.

6. To study the constraints in the utilisation of bio-gas as reported by the respondents.

7. To invite suggestions from the respondents for effective utilisation of bio-gas.
8. To establish relationship if any between various characteristics under study and -
   
a) Performance appraisal (score)
b) Utility perception (index)
c) Attitude towards bio-gas (score)

Present study was confined to 300 respondents possessing and making use of bio-gas for various purposes, cooking being the prime activity consequently for the last 3 years or more. These respondents came from 20 villages situated in four blocks from Akola district of Vidarbha region of Maharashtra.

Respondents were interviewed for requisite data personally with the help of developed and pre-tested interview schedule. Data collected was processed and analyzed through suitable statistical methods. Findings emerged out of the present investigation are summarized below in brief.

1. Majority of the respondents (39.70) percent are in the age category of 41 years and above, receiving formal education upto 4th standard only (57.33 percent) had 6 to 9 members in their respective families (45.33 percent), with agriculture as a principal source of subsistence (67.66 percent), possessing land less than 5 hectares (51.00 percent), had annual income below Rs. 15,000/- (41.66 percent) and according to them possessed animals between 2-5 in number (40.00 percent).

2. Majority of the respondents (83.33 percent) have made use of extension functionary as a source of information to collect relevant details pertaining to bio-gas and consulted (51.00 percent) extension functionary namely GramSevak working at village level for decision making for adoption of bio-gas. Panchayat Samiti was reported as
source of financial assistance by majority of the respondents (73.33 percent) under study.

3. It was further understood that majority of the respondents are using bio-gas manufactured by Khadi and Village Industries Commission followed by number of respondents who used Janata type and Dinbandhu type of bio-gas with a size in the range of 2 to 10 cu m which were according to majority of the respondents had not attached to the latrine.

4. Period of installation of bio-gas had range of 5 to 15 years.

5. Fire wood, cow dung, agricultural waste, kerosene and in very rare cases, petroleum gas were reported to be some of the prominent sources of fuel by the respondents prior to introduction of bio-gas as an innovation.

6. All the respondents (100 percent) reported to have used bio-gas for cooking followed by number of respondents using bio-gas for manuring purposes. Very few of them made use of bio-gas for lighting purposes.

7. It was interesting to note that home-makers and for that matter others used to consume 2323 hours for undertaking important activities in the kitchen such as preparation for fuel, cooking, cleaning the utensils and cleaning the kitchen. Corresponding figure for requirement of time for these activities after installation of bio-gas worked out to be 1364 hours with net saving of 959 hours with maximum saving for preparation for fuel followed by cooking, cleaning the utensils and cleaning the kitchen.

In an attempt to work out saving of money as a result of bio-gas installation it was observed that home-makers used to spend Rs. 7271.00 for preparation of fuel, cooking, cleaning the utensils and cleaning the kitchen before installation of bio-gas and had to spend Rs. 4269.00 after the installation of gas. Thus saving Rs. 3,001.00 which
was attributed to installation of bio-gas. As far as saving of energy is concerned it was observed that on an average 943.65 KJ energy was saved for preparation of fuel, 776.00 KJ for cooking, 520.40 KJ for cleaning and comparatively less quantity of energy (255.49 KJ) was saved from the activity namely cleaning the kitchen.

8. Majority of the respondents (47.67 percent) are in the medium category of performance appraisal score securing total score on the scale in the range of 54 to 57 which was followed by the number of respondents who secured performance appraisal score upto the extent of 53 only and very few respondents were in the high score category with more than 58 score on performance appraisal score.

9. Majority of the respondents (51.30 percent) belonged to medium score category securing utility perception score in the range of 54 to 57 followed by those who were placed in the low category of utility perception score, only 22.00 percent of the respondents obtained score of 58 and more occupying the category of high utility perception score.

10. Majority (52.70 percent) of the respondents belonged to the category of medium scale score with score range from 107 to 114 followed by those who were placed in the low category with a limit of 106 score only. Respondents, however, from the category of high scale score were to the extent of 22.00 percent only.

11. Some of the important constraints reported by the respondents in the utilisation of bio-gas were non-availability of after service either from manufacturers or from dealers, non-availability of expert technicians in the event of emergency, requirement of constant repairs involving additional expenditure, high initial capital investment, non-palatability of food in view of its changed taste and lack of input material such as dung, water and labour.
12. Some of the worth mentioning suggestions offered by the respondents for improving functioning of the bio-gas were,

i) Home-makers and head of the family needs to be convinced for utilitarian value of bio-gas for its adoption,

ii) For effective utilization of bio-gas, organisation of demonstrations on upkeep maintenance and proper use should be organized,

iii) Suitable arrangements for supply of spare parts and technicians services be made through Panchayat Samiti at block level,

iv) Installation of community bio-gas through Gram Panchayat or any other suitable organization at village level is necessary.

v) In the event of excess gas arrangements for storing in cylinder be made,

vi) Quality in the installation work should be given priority over the completion of target earmarked for the extension workers,

vii) Based on experimental suggestions, models with suitable modifications/improvement be introduced.

13. In an attempt to ascertain as to whether there exist relationship between different independent variables included in the study and performance appraisal, utility perception and attitude score, it was revealed that-

a) There exists relationship between education, family size, land holding, annual income, animal possession, utility perception, attitude score and performance appraisal score.

b) Education, land holding, animal possession, performance appraisal and attitude score was related with utility perception score.
c) Establishment of relationship between education, family size, land holding, annual income, performance appraisal, utility perception and attitude score was noticed.

Based on the findings emerged out of the present investigation it can conveniently be concluded that-

i) Bio-gas as an innovation has been considered as moderately useful as non - conventional source of energy.

ii) Evaluating the performance in general, bio-gas has been rated as neither excellent nor poor.

iii) Similarly respondents expressed their attitude neither very much favourable nor very unfavourable.

iv) In general bio-gas possessors were unhappy/unsatisfied on the situation of availability of spare parts, after service and assistance from technicians side etc.