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ASSESSMENT OF SAFE DRINKING WATER AND SANITATION INDICATORS TO EMPOWER THE RURAL WOMEN THROUGH KRISHIVIGYAN KENDRA

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Abstract: *Women are the nuclei of a nation and the builders and modulers of its identity. Women, as human beings, have as much right to full development as men have and so emancipation of women is an essential pre-requisite for economic development and social progress. Sanitation is the science of safe guarding health. It also refers to the means of collecting and disposing of excrete and community liquid wastes in a hygienic way so as not to endanger the health of individual and the community as a whole. Human faeces transmit the most widespread diseases like intestinal parasitic infection, diarrhea, typhoid and cholera. A large number of our villages still do not get adequate supply of potable water. Technologies have been developed for exploration, purification, quality assessment, and storage of water lifted. The study was planned to find out how far the rural women are receptive to training programmes offered by the krishi vigyan Kendra in adopting the safe drinking water and sanitation indicators improvement technologies and what needs to be done in future to strengthen the programme as effective agents for transfer of technology. For the present study, Kancheepuram district has been considered.300 women residing in the chosen villages were selected by using purposive sampling method. Interview cum observation method was adopted for collection of data. The schedule has been structured to contain both closed and open ended questions. For measuring the attitude of the women trainees as regard to training, the investigator constructed Likert's Attitudinal Scales with five points. In the likert scale, the respondent is asked to respond to each of the statements interms of the 5-point scaling, namely, strongly agree (5), agree (4), undecided of neutral (3), disagree(2) and strongly disagree(1) for positive questions and vice versa for negative questions. Each of the scale carries a score. All the women trainees have suggested several reasons as being the cause for non-adoption of safe drinking water and sanitation technologies. Water filter is time consuming, Chlorination leaves behind objectionable odour and Cloth filter does not filter the water fully were the reasons cited by the women for their non-adoption. Lack of funds for construction of latrines, high cost involved in construction of soak pits were the bottle neck for their non-adoption. On the whole, the adoption of effective technologies has helped them to improve their standard of living.*

Keywords: *Sanitaryware, Health awareness, garbage disposal, Clean drinking water, environment*

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INTRODUCTION:

Women are the nuclei of a nation and the builders and modulers of its identity. Smt. Indira Gandhi has stressed that if half of the world population, namely, women are neglected then humanity will be deprived of half of its energy and creativity and that will make the countries poorer. Women, as human beings, have much right to full development as men have and so emancipation of women is an essential pre-requisite for economic development and social progress (Vohra and Sen, 1986; Devadas, 1988). Moreover, economic independence of women will create far-reaching social changes and prove a necessary weapon for them to face injustice and discrimination. Therefore, India is committed to a steady improvement in the status of women to bring them into the mainstream of national development. Along with the economic progress of the country, the economic independence and equality would accelerate the improvement of the status of women.

In India, only 30 percent of the rural population have access to water and virtually nobody has access to latrine (Miller, 1988; Simpson and Herbert, 1995). Of every three people in the world without clean water or sanitation, one is an Indian (Dayal, 1987). Half the ill-health in our villages is caused by water borne diseases (Singh, 1987). Simple methods for making safe drinking water can be taken to all rural communities (Ali, 1989; Jaitly, 1994; Baba, 1994). A large number of our villages still do not get adequate supply of potable water. Technologies have been developed for exploration, purification, quality assessment, and storage of water lifted(India Year Book, 1994; Annual Report 1988–99 Ministry of Human Resources Development). Clean drinking water is the key of human survival, it is the very essence of all life, the symbol of all that is pure, beautiful and serene. Hence drinking water should be free from disease producing organisms – bacteria, virus, protozoa and worms besides being clean and acceptable in taste (Ganesan, 1998).

The rural women must be made aware with affordable methods of purifying water. But proper management of the environment is the need of the hour in order to create equilibrium between environmental hygiene and health. The sanitary conditions in rural areas are very poor. The absence of toilet facilities has led to open field defecation which in turn contaminates rivers and water bodies and consequential adverse effect on health. Because of lack of proper waste disposal system, the sullage water from kitchens and bathrooms are let out into the street and the solid wastes – garbage, rubbish and dirt are

thrown outside the house or dumped on street side thus providing a breeding place for flies and mosquitoes (Gnanambigai, 1998).

Artisans do play a vital role in practicing new techniques in the disposal of wastewater through brick in site system or new soak pit moulders, sanitation devices as well as manufacture of low cost stone sanitaryware. A large number new technology options are available (Chatterjee, 1990; Bimla, 1992). Villages especially require sanitary facilities like soak pits to handle household and well water and other effluence and toilets for the people, especially for women and children (Basu, 1997).

Health of individuals can be promoted only through a sound home environment. Hence surveys conducted in different regions of India show that about 70 percent of mortality and morbidity among rural population can be attributed to the direct or indirect effects of poor environmental conditions in the villages. In the real sense the term sanitation covers the whole field of controlling the environment with a view to prevent disease and there by to promote health (Park and Park, 1991).

Soak pits are used for hygienic disposal of wastewater. It prevents stagnation of wastewater around the house and keeps the place pollution free. A soak pit is a simple device for absorbing and transferring wastewater collected from kitchen and bathroom to subsoil.

Wastewater can become a valuable source of water supply for house garden. Wastewater utilization in the household can be established for the production of vegetables (Gnanambigai, 1998 and Vidya, 1992). Sanitation is the science of safe guarding health. It also refers to the means of collecting and disposing of excreta and community liquid wastes in a hygienic way so as not to endanger the health of individual and the community as a whole (Bimla, 1992; Kumar, 2001). Human faeces transmit the most widespread diseases like intestinal parasitic infection, diarrhea, typhoid and cholera.

Hygiene awareness is probably a much better measure of sanitation coverage than constructing latrines. Once achieved, it creates a demand for other sanitation facilities such as bathing platform, soak pits, garbage disposal, and smokeless chulah as well as for latrines (Das, 1989; Kennedy, 1992, Park and Park, 1995). Following a National Seminar on Rural Sanitation, conducted in 1992 the government made several policy changes that had been strongly advocated by the UNICEF (Watson India, 2000).

OBJECTIVES OF THE STUDY:

1. To understand the attitudes of rural women towards technologies for safe drinking water and sanitation.
2. To identify the technologies transferred and their extent of adoption for rural women.
3. To assess the impact of technology improvement in safe drinking water and sanitation.
4. To suggest suitable modifications in the content and on the conduct of the training programmes and
5. To evaluate the outcome of the technologies for safe drinking water and sanitation transfer programmes.

SIGNIFICANCE OF THE STUDY:

The study was planned to find out how far the rural women are receptive to training programmes offered by the krishi vigyan Kendra in adopting the technologies for safe drinking water and sanitation and what needs to be done in future to strengthen the programme as effective agents for transfer of technology.

METHODOLOGY:

For the present study, Kancheepuram district has been considered. Out of 649 villages in kancheepuram district, 15 villages were selected based on the geographic location that showed direct access to the village from the krishi vigyan Kendra training centre. Krishi vigyan Kendra which offers training to the women is located at close proximity to kancheepuram. The population of the district is nearly 2.8 million by the latest count.

Three hundred women who fulfill the following criteria were selected for the study:

- Women who had undergone training in the period (1997-2000)
- Women, who participated in all the four categories of training programme.
- Co-operative nature of the women.
- Women who are willing to share their experience, giving adequate time.

So, 300 women residing in the chosen villages were selected by using purposive sampling method. Interview cum observation method was adopted for collection of data. The schedule has been structured to contain both closed and open ended questions. It was

designed to collect quantitative as well as qualitative information in the light of observations and experiences during the exploratory village study.

The schedule was framed to gather information. For measuring the attitude of the women trainees as regard to training, the investigator constructed Likert's Attitudinal Scales with five points. In the likert scale, the respondent is asked to respond to each of the statements interms of the 5-point scaling, namely, strongly agree (5), agree (4), undecided of neutral (3), disagree(2) and strongly disagree(1) for positive questions and vice versa for negative questions. Each of the scale carries a score.

RESULTS AND DISCUSSION:

a. The most vital technologies are those which relate to safe drinking water, such as boiling, use of water filter, chlorination, cloth filter, buying purified water or mineral water, establishing aquaguard, zero B and sedimentation. Table 1, shows the methods of getting safe drinking water.

Table 1: Methods adopted to get safe drinking water

Technologies	Adopted	
	N:300	Percentage
Boiling	295	98.33
Water filter	44	14.67
Chlorination	30	10.00
Cloth filter	16	5.33
Purchase of purified water	5	1.67
Aquaguard	5	1.67
Zero 'B'	4	1.33
Sedimentation	3	1.00

Multiple response

It was satisfying to note that boiling, which is a common and easy method, is adopted by 98 per cent of the women. The success of training at KVK campus with reference to safe drinking water could be perceived through this act in that the women had realized the need to boil the water to make into portable. The other methods of purifying water did not get a significant impact of the women due to varied reasons. Often people on travel buy purified and mineral water and also during summer when it becomes an essential thing to do. Aquaguard is also another expensive mechanism, and hence only 2 percent of the trainees households adopt it.

b. Table 2 depicts the factors like age, education and income influencing to adopt the methods of safe drinking water.

Table 2: Factors influenced by age, education and income

Methods	Age			Education		Income		
	< 30 yrs N : 91	31.50 yrs N:189	>50yrs N : 20	Illiterate N : 56	Literates N : 244	<3000 N :221	3000-6000 N : 58	>6000
Boiling (295)	89 (97.8)	187 (98.94)	19 (95.0)	51 (91.97)	244 (100.0)	216 (97.73)	58 (100.0)	21 (100.0)
Water filter (44)	20 (21.97)	20 (10.58)	4 (20.0)	4 (7.14)	40 (16.39)	6 (2.7)	23 (39.65)	15 (71.42)
Chlorination (30)	20 (21.97)	10 (5.29)	-	8 (14.28)	22 (9.01)	-	18 (31.03)	12 (1.75)
Cloth filter (16)	9 (9.8)	4 (2.1)	3 (15.0)	6 (10.71)	10 (4.09)	-	6 (10.34)	10 (47.61)
Purchase of purified water (5)	3 (3.2)	2 (1.05)	-	-	5 (2.04)	-	1 (1.72)	4 (19.04)
Aquaguard (5)	2 (2.1)	3 (1.5)	-	-	5 (2.04)	-	-	5 (23.80)
Zero 'B' (4)	2 (2.1)	1 (0.52)	1 (5.0)	-	4 (1.63)	-	-	4 (19.04)
Sedimentation (3)	2 (2.1)	-	1 (5.0)	-	3 (1.22)	-	-	3 (14.28)
	F value = 0.396 ^{NS}			t value = 1.3 ^{NS}		F value = 15.79 * *		

^{NS}– Not significant * * - Significant 1% level

Age, education did not have any significant impact in adoption of technologies related to purification of water. However the use of chlorination of water, purchase of mineral water and installing aquaguard were not favoured by the older age group women. The illiterate women adopted simple technologies and have not ventured into the sophisticated technologies. The women in the lower strata adopted only two techniques namely boiling water and use of water filter. The higher income group used all the techniques though varied in percentages to obtain potable water, it was significant at 1 % level.

c. Environmental sanitation:

The importance of sanitation as expressed by the selected women trainees show that good sanitary condition is important for protecting the environment. Details regarding environmental sanitation as viewed by the women trainees are presented in Table 3.

Table 3: Environmental Sanitation

Methods of sanitation	Adopted	
	N : 300	Percentage
Clean home	300	100
Clean surroundings	300	100
Covered food	300	100
Sunlight into homes	300	100
Frequently cleaned water tanks	295	98.33
Safe disposal of solid waste	127	42.33
Possessing sanitary latrine	127	42.33
Proper utilization of latrine	127	42.33

Multiple response

The realisation of keeping interiors and exteriors clean and tidy by the women trainees, could be noted from the above data. The age old practice of using the nearby fields for natures call still exist and make the environment dirty. The concept of low cost sanitary latrine should be given much impetus in the training.

As for disposal of the human excreta, even with continuous efforts of KVK only 127 households constructed sanitary latrines. The cost of sanitary latrine came upto Rs. 2500/- and this might be the reason why many of them have not opted for it. The adopters expressed that the sanitary latrine helped them to lead a healthy and hygienic living. Privacy, security and protection of the environment from pollution were the outcomes realized by 42 per cent of the women adopting the technology

d. Personal hygiene:

Though there are number of hygienic practices that should be adhered to lead a healthy life, it has been confined to common eight practices in this study. Table 4 shows the personal hygiene practices adopted by the selected women trainees.

Table 4: Personal hygiene

Contents	Adopted	
	N : 300	Percentage
Wash hands before and after meals	300	100
Comb hair daily	294	98.00
Bathe daily	280	93.33
Wash clothes daily	256	85.33
Cut nails	244	81.33
Avoid buying eatables from street vendors	218	72.67
Wash hand with soap after defecation	196	65.33
Deworming child/adult	120	40.00

Multiple responses

Several healthful practices were instigated to the minds of the women through exhibition. The problems related to unhygienic living was stressed most. The effect of this exercise could be seen from the above data considerable improvement could be noted on the awareness and adoptions of women with regard to hygienic practice. All the women insists their family members to wash hands before and after meals. More women realized the importance of combing the hair (98 per cent), bathe daily 93 per cent and wash cloths daily 85 per cent.

e. Disposal of solid and liquid wastes:

Proper sanitary practices of disposing solid and liquid waste should be adopted by the people to have a clean and healthy environment. The type and quantity of solid waste that occurred daily and the method adopted for disposal by the women trainees were studied. Vegetable peelings, leftover foods, packaging materials and ash were the major solid wastes water around the house could be noticed due to the absence of proper drainage. The back and front open yards of the houses were the areas utilized for cleaning the vessels and washing clothes. Table 5 reveals the methods of disposal of solid and liquid wastes by the women trainees.

Table 5: Disposal of solid and liquid wastes

Contents	Adopted	
	N : 300	Percentage
Compost pit	238	79.33
Kitchen garden	126	42.00
Proper drainage	119	39.67
Reuse of water	32	10.67
Soak pit	28	9.33

Multiple response

In the rural areas there is no system for collection and disposal of refuse. Refuse is thrown around the house indiscriminately resulting in gross pollution in this soil. Hence, the technology of constructing the soak pit made 95 per cent of the families who constructed the soak pit to dispose the solid waste in most hygienic manner. Waste water can become a valuable source for water supply for house garden. Waste water utilization in the household can be established for the production of the vegetables. Therefore, the possibilities and advantages of raising kitchen garden were explained during the training period. Forty two

per cent of the families, (126 women) raised the kitchen garden. Soak pit are used by a meager per cent of women for hygienic disposal of waste water, it prevents stagnation of waste water around the house and keeps the place pollution free.

f. Prevention of water borne diseases:

The role of education could be seen in the prevention of communicable and infectious diseases like cholera, typhoid fever, malaria, hook-worm, anaemia, leprosy and tuberculosis. Water borne diseases could be prevented through following immunization, avoiding eating outside during epidemics, spraying insecticides, drinking boiled water, adopting personal hygiene habits and visiting doctor for treatment. Table 6 shows the prevention of water borne diseases.

Table 6: Prevention of water borne diseases

Methods to prevent diseases	Adopted	
	N 300	Percentage
Personal hygiene	300	100.00
Drinking boiled water	295	99.00
Avoid eating outside during epidemics	272	90.67
Visiting doctor	242	80.67
Immunisation	239	79.67
Spraying insecticides	104	34.67

Multiple response

Cent percent of the women trainees stated that adopting personal hygiene habits was one of the methods to prevent water borne diseases. A majority of 99 per cent of the trainees households boil the water, followed by 91 per cent of them avoid eating outside during epidemics. A large majority (81 per cent) is also in the practice of visiting doctors. Which indicates that households do not compromise on health and visit doctors whenever necessary, even if they cannot afford visiting them. Immunization schedule, especially for children, is followed by 80 per cent and the remaining 20 per cent stated that their children were grown up. Spraying insecticides is practiced by 35 per cent of the women trainees since water borne diseases are easily transported by mosquitoes and other insects.

g. Table 7 indicates the reasons for not adopting the safe drinking water and sanitation.

Table 7: Reasons for not adopting the safe drinking water and sanitation practices

Safe drinking water and sanitation	N:300	Percentage
1.Not adopting safe drinking water		
*Sedimentation not fully purified	297	99.00
*Zero 'B' – comes out of the tap	296	98.67
*Aqua guard – costly	295	98.33
*Purchase of purified water – costly	295	98.33
*Cloth filter – not fully purified	284	94.67
*Chlorination – dislike the odour	270	90.00
*Water filter - take time to filter	256	85.33
*Boiled water – do not like the taste	5	1.67
2. Environmental sanitation		
*Soak pit costly, needs manual work	272	90.67
*Reuse of water – do not like	268	89.33
*Open drainage – production of insects	181	60.00
*Kitchen garden – no space, no time	174	58.00
*Sanitary latrine – not availed	173	57.67
*Compost pit – no land, open space leads to put the waste	62	20.67
*Frequently clean the water tank – carelessness and laziness	5	1.67
3.Personal hygiene		
Deworming – country medicines are forgotten, primary health centre far off places, aversion to take medicines	180	60.00
Wash hands after defecation – open toilet: soap is not taken to that place, laziness	104	34.67
Avoid buying eatables from outside – non availability such edibles at home, scarcity of time to prepare such edibles, lack of know how making such items, eagerness of the children to buy the items immediately	82	27.33
Cut the nails- not attaching importance, nails are used as weapons to perform some work, due to excess of manual work nails are worn out naturally	56	18.67
Wash clothes daily – scarcity of water, accustomed to wash at frequent intervals	44	14.67
Bathe daily – scarcity of water, accustomed to wash at frequent intervals	44	14.67
*Combing hair – laziness, carelessness	6	2.00

4.Water borne diseases		
*Spraying insecticides - costly	196	65.33
*Immunization – children are grown up	61	20.33
*Visiting Doctor – free medical services are not easily available at their places, private doctors are charging more for treatment, do not hold money always	58	19.33

Multiple response

As shown in the Table all the women trainees have suggested several reasons as being the cause for non-adoption of safe drinking water and sanitation technologies. Water filter is time consuming, chlorination leaves behind objectionable. Odour and cloth filter does not filter the water fully were the reasons for their non adoption. Lack of funds for construction of latrine, no space to raise the kitchen garden, high cost involved in construction of soak pit were the bottle neck for their non adoption.

h. Table 8 depicts the factors like age, education and income influencing to adopt the methods of safe drinking water

Table 8: Factors influenced by age, education and income

Methods to prevent diseases	Age			Education		Income		
	< 30 yrss N : 91	31.50 yrs N:189	>50yrs N : 20	Illiterate N : 56	Literates N : 244	<3000 N :221	3000-6000 N : 58	>6000
Personal hygiene (300)	91 (100.0)	189 (100.0)	20 (100.0)	56 (100.0)	244 (100.0)	221 (100.0)	58 (100.0)	21 (100.0)
Drinking boiled water (295)	89 (97.8)	187 (98.9)	19 (95.0)	51 (91.1)	244 (100.0)	216 (97.7)	58 (100.0)	21 (100.0)
Avoid eating outside during epidemics (272)	79 (86.8)	134 (70.9)	19 (95.0)	50 (89.3)	222 (90.98)	219 (99.1)	43 (74.1)	10 (47.6)
Visiting doctor (242)	60 (65.9)	162 (85.7)	20 (100.0)	29 (51.8)	213 (87.3)	166 (75.1)	55 (94.8)	21 (100.0)
Immunisation (239)	60 (69.5)	159 (84.1)	20 (100.0)	29 (51.8)	210 (86.1)	163 (73.8)	55 (94.8)	21 (100.0)
Spraying insecticides (104)	19 (20.9)	70 (37.0)	15 (75.0)	24 (42.9)	80 (32.8)	33 (14.9)	50 (86.2)	21 (100.0)
	F value = 10.96 * *			t value = 2.47 * *		F value = 6.82* *		

*** * - Significant 1% level**

Irrespective the age, education and income all the women inculcate the personal hygiene habits. With a commendable efforts of the investigator more than 91 per cent of the families used boiled water in order to avoid water borne diseases. Nearly 53 per cent of the

high income group still resort to eating outside even during epidermics. Experts a considerable per cent of younger age women belong to the age group of 31 – 50 and above 50 years did not adopt the method of spraying insecticides. Education does not have much influence in this act. But has income increases the percentage of women adopt this technology in order to control the insects.

The statistical analysis showed that age, education and income of the family showed a significant at difference at 1 % level in adopting the prevention of water borne diseases.

SUMMARY AND CONCLUSION:

The success of training at KVK campus with reference to safe drinking water could be perceived through this act in that the women had realized the need to boil the water to make it portable. The other methods of purifying water did not get a significant impact of the women due to varied reasons.

Even with continuous efforts of only 42 per cent of the households constructed sanitary latrines. The cost of the sanitary latrine came up to Rs. 2500/- and this might be the reason why many of them have not opted for it. However the adopters were expressed that the sanitary latrine helped them to lead a healthy and hygienic living. Privacy, security and protection from the environment pollution were the outcomes realized by 42 per cent of the women adopting the technologies. The age-old practice of using the nearby fields for the natures call still exist even in this modern era. This brings forth that the concept of low cost sanitary latrine should be given much impetus in the training programme.

Considerable improvement could be noted on the awareness and adoption of women with regard to hygienic practice. All the women insist that the family members to wash their hands before and after meals. Majority of women had realized the need to improve their physical appearance by adopting hygienic habits. The technology transfer with reference to disposing of the solid waste in most hygienic manner made 79 per cent of the families to construct compost pits. One hundred and twenty six women (42 per cent) disposed the sullage by diverting it to the kitchen garden. Soak pits are used by a meager percentage of women for hygienic disposal of wastewater, it prevents stagnation of waste water around the house and keeps the place pollution free.

All the women whole heartedly expressed their views that adopting safe drinking water and other sanitation technologies helped in preventing communicable diseases. With the

untiring efforts and stress given by KVK 80 per cent of women realized the importance of immunization to the children.

Age did not have any significant impact in adoption of technologies related to purification of water. The illiterate women also adopted simple technologies but they have not ventured in to the sophisticated technologies. The higher income group due to their affordability used all the techniques to obtain potable water.

All the women trainees have suggested several reasons as being the cause for non-adoption of safe drinking water and sanitation technologies. Water filter is time consuming, Chlorination leaves behind objectionable odour and Cloth filter does not filter the water fully were the reasons cited by the women for their non-adoption. Lack of funds for construction of latrines, high cost involved in construction of soak pit were the bottle neck for their non-adoption.

Irrespective of the age, education and income all the women inculcate personal hygienic habits. Education does not have much influence in this act.

CONCLUSION:

All of them unanimously raised their opinion that the transfer of technology training opened up new visits in their life and made them to come out of their village premises removing the cultural, social and economical barriers. Apart from the training they learnt importance of values and goal orientation, decision making pattern, resource allocation methods, the needs for keeping clean interior, exterior and adopting balanced menu in their diet. Thus, it can be concluded that the training imparted at KVK paved way for their developing personality traits which in turn result in empowerment.

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