CHAPTER V

SUMMARY AND CONCLUSION

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1.0 Summary

This study was designed to ascertain and measure family's extent of adoption of a selected model of improved chulha, viz., Mamta Chulha (EAMC). The analysis of the dependent variable - EAMC - centred upon its relationship with selected independent variables of the study.

Adoption of MC implies acceptance of this innovative chulha which is new and different from traditional rural chulha (TRC) and its use in daily cooking and gradual or immediate replacement of TRC in cooking.

The parameters identified to measure EAMC included extent of replacement of TRC by MC, extent of use of TRC in pre and post installation period of MC, variety in cookstoves used, extent of use of MC, functional status of MC, period of use of MC, measures taken/to be taken to facilitate continued use of MC, and recommendation of use of MC to others. Firewood continues to be the major fuel for rural families who burn it in inefficient traditional chulhas. Unless necessary measures are taken, by the turn of the century there may be enough food for the millions of people but not enough fuel to cook. Of the various alternatives open to conserve existing resources of biomass, Improved Chulhas (IC) loom large as an attractive one in view of its higher thermal efficiency, smokelessness and time saving in cooking. Government of India launched National

Programme on Demonstration of Improved Chulha (NPDIC) in December 1983 which was subsequently converted into NPIC in April 1985 due to overwhelming response from beneficiaries. The beneficiary families might accept or reject a chulha.

Mamta Chulha was chosen as the model of improved chulha to explore beneficiary families' adoption behaviour towards improved chulhas. Mamta chulha is a versatile chulha which is promoted under NPIC in Gujarat State by State nodal department - Deptt of Panchayat and Rural Housing Development of State Government (SG), State nodal agency - Gujarat Energy Development Agency through its network of Non-Governmental Organisations (NGOs) and Technical Backup Support Unit - NPIC (TBSU-NPIC). MC is a model that is promoted in Gujarat State in mud as well as in prefab ceramic liners. The beneficiary families' adoption behaviour in relation to Mamta Chulha would be relevant to other models of improved chulhas that are comparable in design. Families who can still procure fuelwood without much difficulty and for whom the opportunity cost due to dependency on TRC is not significant would be inclined to accept Mamta Chulha due to its smokeless cooking, time saving and drudgery relieving aspects along with its fuel saving potential. At the same time families might be concerned about the shifts in cooking habits and practices they have to make in switching over to MC from TRC. They also would be concerned about the care and maintenance of MCs. Families follow certain lines of action which would lead to switching over to the innovative stove - MC or its rejection as a new innovative cooking unit.

Several studies have been conducted in the past with reference to energy consumption pattern and monitoring and servicing of different improved technologies. However very little effort has been made so far to study in depth the extent of adoption of improved chulha by beneficiaries of NPIC, though several researchers suggested different ways and means to improve the functionality rate of improved chulhas. For the present study adoption of MC was defined as the decision of beneficiary families to accept and use an innovative cookstove, viz., MC in daily cooking in the place of traditional or conventional stove by following certain lines of action. These lines of action put constraints on the use of TRC and facilitate continued use of MC and propagate its use to others. Extent of adoption of MC reflects the extent to which an innovative stove - MC - is accepted and used in daily cooking as evidenced by the extent to which it replaced TRC amongst other things.

1.1 Objectives of the Study

The specific objectives drawn for the study were to

(i). Ascertain energy resource consumption pattern of beneficiary families of NPIC.

(ii). Assess the response of beneficiary families of NPIC towards traditional rural chulha (TRC) and a selected model of IC, viz., Mamta Chulha (MC).

(iii). Measure extent of adoption of MCs installed under NPIC by selected beneficiary families.

(iv). Construct appropriate instruments to measure energy management practices (EMP) and main cooks' perceived levels of costs and benefits in adopting an improved chulha like MC vis-a-vis TRC in daily cooking and assess energy management practices of families (EMPF) and perceived cost benefit ratio (PCBR) of main cooks.

(v). Determine the inter-relationships between extent of adoption of MC with the selected situational, personal and family variables.

1.2 Method of Procedure

Mamta chulha adoption scale (MCAS) was developed to measure the extent of adoption of MC by beneficiaries of NPIC. MCAS used in the present study was evolved based on previous researches undertaken by Technical Backup Unit, Home Management Department, and other researchers with some additions and modifications. The main cooks reported on families' adoption of MCs. The extent to which families followed certain lines of action which reflected propagation, acceptance and use of MCs in the place of TRCs in daily cooking was called the extent of adoption of MC. Two instruments - one to ascertain EMPF and the other to measure PCBR were also developed. The instruments were validated prior to its use in the pilot study. After the pilot study the reliability of these instruments were established. All the instruments had commendable degree of reliability. MCAS had eight aspects to measure extent of adoption of MC. The EMP scale had 23 statements and cost benefit perception scale (CBPS) contained twenty four statemts.

The sample of the study comprised of beneficiary families of NPIC where MCs were minimum eight months old. Thus data were collected from a purposive sample of 390 beneficiary families - 130 each from Kanjari of Mehsana district, Vadadla and Sindhrot of Baroda district where Non-Governmental Organisation (NGO), State Government (SG) and Technical Backup Support Unit (TBSU) respectively had installed MCs. While NGO had installed MCs in mud SG and TBSU had installed MCs in prefab ceramic liners. In addition to furnishing base line data the respondents (main cooks) reported on sources of energy availed of, the cost incurred on energy consumption per month, reason for using the particular source/s of energy availed of by the families, number of persons involved in procuring cooking fuel, mode of its procurement and different types of stoves used for cooking, problems with TRC, use of TRC prior to and after installation of MC motivating factors to become a beneficiary of NPIC, location of MC, details on installation of MC, extent of participation of main cooks and families in NPIC, functional status of MC, period of continued use of MC, changes made in cooking and fuel management practices due to MC, reasons for satisfaction and dissatisfaction with MC, families' adoption of MC and energy management practices of families (EMPF). Lastly CBPS was administered on the respondents.

1.3 Major Findings of the Study

1.3.1 Base line Data

The mean age of the main cook was 35.75 years. Nearly 84 per cent each belonged to were illiterate group and general

category by caste. The mean family size was 5.47. The mean landholding of the sample was 6.97 hectares.

1.3.2 Level of Quality of Housing of Beneficiary Families

More or less an equal distribution of families was observed with reference to type of housing, i.e., twin block, detached units and row housing with the incidence of the last being the least. The housing in majority (95 per cent) were semipucca in nature of materials used for walls, floors and roof. Depending on community water sources was the highest with domestic piped water supply observed in only 3 per cent cases. Sanitary service unit comprised of a temporary shed in 51 per cent families with 32 per cent resorting to open bathing. Most of the sample (95 per cent) had no toilet facility and hence resorted to open defaecation. Mean score of the sample on LQH was 11 in a scale range of scores of 5 to 15.

1.3.3 Extent of Possession of Consumer Durable Goods

The families revealed a mean EPCDG score of 42.00. About 10 per cent earned scores above 73 thereby revealing fairly high level of living in terms of EPCDG while 20 per cent earned a score of 25 or less thereby revealing the small proportion whose level of living was rather low.

1.3.4 Extent of Demands on Main Cook's Time

The mean score on EDMCT was 36.95 with an SD of 13.87. About 39 per cent of the families earned a score of 30 or less

implying that the demands on their time from household chores was relatively low as they received considerable help from family memebers. On the other hand, 19 per cent main cooks revealed greater demands on their time from household tasks as they did not receive much help from others in the family.

1.3.5 Energy Base of End Uses (EBEU) and Extension of Activities of Family After Dusk (EAFAD)

The mean EAFAD score was 14.73 on a scale range of score of 8 to 24. The relatively low mean score indicated relatively low indulgence in energy based activities of family after dusk. The mean EBEU score of the sample was 7.91 and the possible range of score was 4 to 12. Majority of the families (55 per cent) earned more than 7 scores.

1.3.6 Energy Management Practices of Families

The possible range of scores on EMP scale was 23 to 69. The mean EMPF score of total sample was 52.50. Nearly 42 per cent of the families earned a score between 53 to 58 while 31 per cent earned an EMPF score ranging from 47 to 52. About 15 per cent of the families exhibited remarkably energy conserving practices as evidenced by their EMPF score of 59 or more.

1.3.7 Extent of Interaction of Main Cooks and Families with Different Spheres

The extent of interaction of main cooks and their families with different spheres were estimated. Nearly 50 per cent of the main cooks earned EIMCDS score falling between 61 to 70 while 50

per cent families earned EIFDS score ranging from 151 to 250. The mean EIMCDS score was 55 and the range observed was 30 to 98. The mean EIFDS score of the sample was 242.92 and the range in scores was 42 to 551.

1.3.8 Energy Resource Consumption Pattern Other Related Aspects

Fuelwood was used for cooking purpose by all the families. Families differed in terms of the sources of procurement of different fuels. Mean distance travelled to collect fuel was 2.77 km. Carrying by headload was the most common mode of trasporting fuelwood home. Verandah or any other room was used for storing fuel by 63 pe r cent families. All families faced varied problems in storing the fuel, the most prominent ones being lack of storage space (63 per cent) and absence of sheltered storage for fuel during monsoon (58 per cent).

The mean monthly purchase of fuelwood and kerosene was 68.08 kg and 4 lt respectively. Mean monthly expenditure on fuelwood, kerosene and electricity was Rs. 66.67, Rs.15.59, and Rs.22.04 respectively. Mean monthly expenditure on all purchased fuels amounted to Rs.56.00 with the mean monthly expenditure on fuels like biomass, kerosene and electricity being Rs.52.17. Mean PRACFS score and PRAACFS score were 5.26 and 2.63 respectively.

Majority of the respondents and their daughters started cooking between the ages of 10 and 15 years. Male participation was more in procuring and transporting fuel than in preparation of fuel, cooking and cleaning tasks. A little less than 50 per

cent of the families cooked and served meals and tea twice a day. Mostly rotla and sabji for lunch, khichdi and kadhi for dinner were common items prepared in more or less all the families.

1.3.9 Responses on TRC

Shielded `horse shoe' shaped TRC was the main stove that was used by nearly cent per cent of the families and it was preferred mainly as it could burn large quantity of varieties of biomass that formed cheap source of cooking fuel to them. In 93 per cent of the families, TRC was constructed by the main cook. Local materials like mud, ash and fine dust were used for constructing TRC in 99 per cent of families. The most quoted problems faced with TRC were excessive smoke (81 per cent), eye irritation (78 per cent) and soot deposition on walls (71 per cent) and vessels (56 per cent).

1.3.10 Responses about MC

Nearly one-third of the families received information about MC through government and voluntary agencies. Smokelessness was the major motivating factor to adopt MC in 80 per cent of the families. Nearly all the families had MC installed in an enclosed area. Changes in cooking and fuel management practices due to MC were made by 82 per cent and 46 per cent respectively. A negligible proportion cleaned the chimney pipe and 45 per cent never attended to any repair work. The follow-up of MC by SEW declined after six months of installation of MC. Nearly 52 per cent were satisfied with MC due to varied reasons, among them `less smoke' in kitchen was the major one. Nearly 26 per cent

could save time due to MC. A negligible proportion of families made changes in the physical structure of MC. The mean score on LQIMC was 19.90. Mean EPFNPIC score was 17.24 where as mean EPMCNPIC score was 10.73. The mean EAMC score was 20.18 while the mean PCBR score was +0.14.

1.3.11 Profiles of High and Low Scoring Families on MCAS

A comparison of high scoring families with low scoring families on MCAS revealed that the high scorers were characterized by higher education level of main cooks, small landholding, lower LQH, and higher EPCDG. The high scorers revealed lower EIMCDS and higher EIFDS and better EMPF. The high scorers seemed to exercise better energy management practices which could have enabled them to adopt MC to conserve biomass and learn its optimum use to a greater extent than low scorers and they were able to perceive the benefits of MC better than low scorers. The other characteristics of high scorers were higher EPMCNPIC and EPFNPIC, better LQIMC, higher PRACFS and PRAACFS, higher EAFAD and PCBR. Since the quality of installation of MC of high scorers was good and their exposure to UECs was high, probably they could understand merits and demerits of MC which led to higher PCBR which in turn made them better adopters. On the other hand, low adoption scorers were characterized by relatively lower education level of main cook, larger land holding, better LQH, lower mean score on EPCDG, EAFAD and slightly higher score on EIMCDS and lower EIFDS. The other charateristics were poorer EMPF, lower EPMCNPIC and EPFNPIC,

lower PRACFS and PRAACFS, lower PCBR and lower LQIMC. It shows that since the LQIMC, EPMCNPIC and EPFNPIC were low, low scorers could not perceive the benefits of MC as their counter parts, hence their adoption was low. However high and low scorers compared well in their mean family size, age of the main cook, score on EBEU and EDMCT.

1.3.12 Profiles on High and Low Scoring Families on CBPS

When 130 high scoring and 130 low scoring families on CBPS were compared it was observed that the high scoring families had main cooks with higher education level, better PRACFS and PRAACFS, higher EPMCNPIC and better LQIMC in their kitchens. Probably with a better education level, higher exposure to NPIC and better LQIMC, high scorers could perceive more benefits than costs in adopting an MC. On the contrary low scorers were characterized by relatively lower level of education, lower PRACFS and PRAACFS, lower EPMCNPIC and poorer LQIMC. However high and low scorers compared well in their family size, age and score on EIMCDS.

1.3.13 Extent of Adoption of Mamta Chulha in Relation to the Variables Under Study

Extent of adoption of MC was positively correlated with extent of activities of family after dusk (r = .129 **), energy management practices of family (r = .329 **), extent of participation of main cook in NPIC (r = .302 **), extent of participation of family in NPIC (r = .308**), level of quality of installation of MC (r = .114*), perception regarding available

cooking fuel sources (r = .198**), and perceived cost-benefit ratio (r = .667 **); it was negatively correlated with extent of interaction of main cook with different spheres (r = -0.111 *). Apparently as extent of interaction of main cook with different spheres increased EAMC decreased. However, the higher the extent of activities of family after dusk, energy management practices of family, extent of participation of main cook and family in NPIC, level of quality of installation of MC, perception of cook regarding available cooking fuel sources, and perceived cost-benefit ratio, the higher the extent of adoption of MC. Families with moderate extent of possession of consumer durable goods showed greater EAMC than those with less EPCDG.

Probably when cooks from relatively better socio-economic position interacted with different spheres, especially, the larger environment to a greater extent than their counterparts from other socio-economic groups, it seemed that they would be having wider exposure and choice. In such cases they might opt for sophisticated technologies like gas stove rather than a non-conventional cooking technology. The greater exposure of main cooks to different environments surrounding her and family enabled her to identify better fuels and stoves like cooking gas and gas stove as the cooking fuel and technology she would like to have rather than an improved stove and the age old conventional fuel, i.e., biomass which is rather messy. The need for wider publicity and awareness generation to make ecologically and environmentally sound at grass-root level emerges from the study.

No significant relationship was found to exist between extent of possession of consumer durable goods and EAMC. However families with low EPCDG were better adopters of MC than those with moderate or high of EPCDG. This could be due to the fact that those with low EPCDG had probably more aspirations in relation to standard of living and hence greater desire to acquire more consumer durable goods which raises their level of living. It seemed such families were more inclined to adopt this innovative cookstove.

It seemed that families with high EAFAD had higher aspirations for a better standard of living than their counterparts. Moreover, higher the EAFAD, the greater the demand of energy forms. Hence families with higher score on EAFAD may be inclined to reduce energy consumption in other aspects of life like cooking by adopting an improved cooking technology like MC.

Higher the EMP score the greater the energy conservation oriented behaviour acts. Such families adopted MC probably to conserve biomass and to reduce the hardship in fuel procurement. Families with higher EPMCNPIC and EPFNPIC learnt well about the working mechanism of MC through their observation and participation in cooking demonstrations and lecture cum discussions. Hence they could perceive its advantages in a better manner than their counterparts which led to their adoption of MC to a greater extent. Apparently families with better LQIMC viewed MC as a novel technology worthy of sustained use to a greater extent than their counterparts.

The beneficiary families of Sindhrot adopted MC to greater extent than those of Vadadla and Kanjari. While the beneficiaries of Vadadla and Kanjari revealed more or less same EAMC which was relatively low SG implemented NPIC in Vadadla, NGO in Kanjari and TBSU in Sindhrot. The strategy followed by TBSU was distinctly different from the other two in that publicity and awareness generation campaigns and UECs adopting cluster approach were part and parcel of implementation of NPIC. Moreover medium size MC in ceramic were installed in Sindhrot in contrast to medium size mud in Kanjari and small size MC in ceramic in Vadadla. One UEC each was conducted for a cluster of 20 to 25 beneficiary families. The beneficiary families of Sindhrot learned about the merits and demerits of adopting MC and also use, care and maintenance of MCs which resulted in its higher rate of adoption in Sindhrot as compared to the other two villages. User appropriateness of the model of improved chulha promoted alongwith the perspective that beneficiary families gained from its promoter probably contributed to its greater adoption rate in Sindhrot.

Alongwith increased perception regarding available cooking fuel sources they probably became aware of the difficulty associated with the sources from where they could procure fuel which might have enhanced their EAMC. In other words, if main cooks associated greater effort in procuring depleting fuel from available sources, then they would be inclined to over come the difficulties by adopting a technology that is efficient to stretch the same quantum of cooking fuel to last longer. Those families whose main cooks perceived more benefits than costs in

owning an MC, adopted it. Only when users perceive the profitability from adoption of any innovation, they would be inclined to adopt it.

Families that belonged to SC/ST category were better adopters of MC than those from general category. Families from general category could be those with source for adequate supply of free fuels that they did not recognize the need for adopting MC. On the other hand the families belonged to SC/ST though may be dependent on free gathered fuel, found it worthwhile to adopt MC in view of the benefits of reduction in their input in fuel collection, cleaning of vessels, walls and saving in cooking time. In addition, they were motivated by the offer of `panniyaru' (mud water tank) which probably prompted them to adopt MC.

It was found that variables like EIFDS, EBEU, LQH, EDMCT, age and education of main cooks, PRAACFS, family size and landholding did not appear to have any significant relationship with EAMC.

The most influencing factor on EAMC was PCBR. LQIMC emerged out as the second most important variable influencing EAMC. EMPF, EPCDG, EIMCDS, and EAFAD influenced EAMC in declining order. EPMCNPIC, EPFNPIC, PRACFS, EPCDG and others seemed to be exerting no significant influence on EAMC of beneficiary families in the presence of the former set of variables.

2.0 Conclusions

Cooking is a major conventional fuel dependent and energy intensive activity of rural families. Beneficiary families are heavily dependent on biomass to meet cooking energy needs. With increase in scarcity of fuelwood and increase in cost of liquid fuels, rural families, by and large, did not reveal the tendency to switch over to commercial fuels like kerosene for cooking purpose. Rural families were cognizant about the ill effects of cooking at TRC and exhibited remarkable extent of adoption of Mamta chulha.

Majority of the beneficiary families were using MC either regularly or occasionally. The period of continued use of MC was 6 or more months by majority of the beneficiary families.

Families exhibited differential levels of extent of adoption of MC. EAMC was negatively correlated with EIMCDS. Families with moderate level of EIMCDS were less inclined to adopt MC than those whose extent of interaction of the main cook with different spheres was low.

EAMC was positively associated with EAFAD. Families with high EAFAD score adopted MC better than those with low and moderate EAFAD scores.

As EPMCNPIC and EPFNPIC increased, EAMC increased. Families with high participation in NPIC adopted MC to a greater extent than those with low and moderate participation in NPIC. Similarly families with high scores on main cooks' extent of

participation in NPIC were found to adopt MC to a greater extent than those with moderate scores on main cooks' extent of participation in NPIC.

LQIMC was positively correlated with EAMC. Families with MCs where quality of installation was moderate or high were better adopters of MC than those with low quality of installation of Mamta chulha.

There was a significant positive relation between EAMC and PRACFS. Families with main cook's having high perception regarding availability of cooking fuel sources adopted MC to a greater extent than those with low or moderate perception.

PCBR was positively correlated with EAMC. Families where main cooks had higher PCBR were better adopters than those where main cooks had low or moderate PCBR. Main cooks with low PCBR were poor as adopters of MC.

As families revealed better EMP, their EAMC too increased. Families with good energy management practices (high scores) adopted MC more than those with poor (low scores) and fair EMP (moderate scores). Similarly families that exhibited fair energy management practices (moderate scores) adopted MC to a greater extent than those with poor EMP (low scores).

A hierarchical order in the factors studied in relation to their influence on EAMC was found to exist. PCBR, LQIMC, EMPF,

EPCDG, EIMCDS and EAFAD emerged out as the major predictors of EAMC.

3.0 Implications of the Study

The findings from this study can be seen in relation to its implications for conceptualisation of strategies to enhance extent of adoption of innovations like MC and for designing future adoption-innovation related research studies in the area of NPIC and others. Directly these findings can be of use in chalking out action programmes to motivate families to conserve energy sources through acceptance of MC or any other IC promoted under NPIC at micro level and to help in reaching the national goal of biomass conservation.

3.1 Future Research

Adoption scale modified and developed herein measured the extent of adoption of Mamta chulha by families. The same instrument might be adapted to study the effect of independent variables on each of the aspects of adoption scale rather than on extent of adoption as a whole. Comparative studies could be conducted to gain insight into extent of adoption of (a) early adopters and late adopters (b) fixed and portable models of improved chulhas, (c) various kinds of fixed models (d) MCs within an year and 2 years after its installation (e) purchased and gathered fuelwood consumers to identify those with greater acceptability and the most cost effective values to the rural family and to the polity. Different adoption studies at national, regional, state and local level can also be conducted.

Extent of adoption of MC in relation to other variables such as perception of good quality of kitchen, scarcity of fuel, type of meal pattern, implementation strategy and modern technologies for various end uses could be investigated.

Psychological traits of main cooks like willingness to change, satisfaction can also be studied with reference to adoption of MC or any other IC.

Extent of adoption in relation to other improved technologies such as solar cookers and biogas and other labour saving devices can also be explored.

3.2 Action Programmes

The study showed that perceived cost benefit ratio, level of quality of installation, energy management practices of family, extent of possession of consumer durable goods, extent of interaction of main cook with different spheres, and extension of activities of family after dusk emerged out as crucial factors in adopting MC. The other factors which could also have influenced the extent of adoption were extent of participation of families and cooks in NPIC through their involvement in UECs, publicity and awareness generation campaigns, identification of appropriate designs to match their needs, awareness on the need to switch over to improved stoves like MC in the context of energy scarcity, merits and demerits of MC vis-a-vis TRC and available sources of cooking fuels and constraints to procure from these.

The observations made in relation to MC and conclusions drawn would be relevant and applicable to any IC promoted under NPIC. Appropriate steps to reach potential target group of NPIC through maximum exploitation of mass media to generate public awareness on cooking fuel crisis and raise their social responsibility need attention of policy makers. Publicising and generating awareness amongst rural children and youth through secondary and higher secondary schools need special attention.

Involvement of the target group in a technology transfer programme like NPIC is vital for its successful adoption. The promoting agencies of ICs like MC - governmental or non-governmental - should make it mandatory for its grass-root level functionaries and stove builders to adopt a participatory model wherein the ultimate users of MC or any IC are involved in choice making. The changes made in MC by its users implies that there is a need to modify the design of MC according to the users' needs. An appropriate model to suit user needs should be the guiding principle in the selection of IC by a particular promoter and family. Concrete efforts need to be made to enable the target group make the right choice weighing pros and cons of adopting MC in the place of TRC. ICs like MC ought to find a place in kitchens of those who volunteer to adopt it in daily cooking through the conviction they have in terms of benefits that would accrue to them and to environment by virtue of their status as beneficiaries of NPIC and its adopters. Promotion of MCs should be supported with necessary infrastructural facilities like trouble shooters, prefab liner production units, traders and

retailers for stove component replacements, stove builders and so on to ensure sustained use of MC. Rapid rural appraisals, group discussions and user education programmes should form integral components of NPIC. The field workers and stove builders ought to be trained in conducting such activities. Building a workforce to meet user training requirements of NPIC needs special attention of policy makers and implementors.

Awareness among potential beneficiary families should be generated regarding the need for the services of an SEW and making monetary payment to SEW for repair and servicing in order to sustain its use. Monitoring the work of SEW by implementing bodies, market outlet in village, availability of SEW in each location, availability of moulds for mud chulha construction in the village itself at an easily accessible point and intensive education on the merits of ICs like MC ought to be integral part of strategies for implementation of NPIC. The implementing agencies should follow the guidelines provided by Government of India. SEW should be a good communicator, have good personality to maintain good interpersonal relationships with the target group and should convince the people to adopt the technology. Cooking competitions on ICs should be conducted and provision should be made to provide incentives to the beneficiary families.

A communication package on cooking fuel scenario in India and elsewhere in the developing world, impact of cooking fuel crisis on women, children, agriculture, health, nutrition and work efficiency of population, the need to switch over to ICs

like MC from TRC, cooking and fuel management, and care and maintenance of MC highlighting impact of NPIC on rural economy, environment, health and development of women, need to be brought out for the use of government and non government organisations involved in NPIC. The target group in general and women in specific ought to realise the value of improved cookstoves not only for the present generation but also the future ones, to fully cognize its benefits over relatively negligible cost factors, to ensure its adoption and achieve sustained use in day-to-day cooking.

A one-time user education camp in a village would not achieve high PCBR. Cluster approach to train MC adopters would pay higher dividends in terms of its functionality rate and biomass conservation as a result of increased PCBR. Accountability of SEWs ought to be raised and it should be made mandatory for SEWs to conduct repeated demonstrations using cluster approach and individual approach as the situation warrants, and undertake follow up and trouble shooting to ensure total shift from TRC to MC.

The consumer appeal for prefab lined stoves in contrast to mud stoves emerges from the study. The beneficiaries felt that a product is reaching their kitchens when MC with prefab liner components of pottery instead of mud stove is received by them. Moreover pottery lined MC is fast to install, dimensions are retained with an assurance of efficient performance of stove and replacements are possible in case of breakages of liner with use. The need for widespread promotion of pottery/ceramic lined stoves

looms large and offers tremendous potential as NPIC moves from a subsidised programme to a commercial programme in due course of time. Widespread dissemination of MC in pottery/ceramic liners creates entrepreneurial opportunities which could be made use of by women or men through launching MC stove liner production units or its trading, over and above that can be taken up by potters. Such ventures will throw open employment avenues for potters or skilled artisans who do not have the means or the knowledge to start their own production units.

Success of NPIC depends on people's participation and their realisation of benefits of MC or any IC over its costs which in turn depends on translation of objectives, strategies and policies of implementation of NPIC from document to field situation by implementors and committed grass-root level functionaries. In every TBSU, one model exemplary pottery production centre should be started which can be replicated by entrepreneurs or potters who would be working through SG or NGOs. Promotional strategy should have provision for replacement of parts of IC. Since life of mud chulha is very short any effort to strengthen quality of installation/functionality rate will pay dividends. Women co-operatives can be formed to take care of trading of ICs like MC.

Home Science colleges especially Home Management Department should educate rural mass about need for the energy conservation in the current ecological context and involve in cooking demonstrations, attitude and value changes in adopting a new

technology like MC. National Council of Educational Research and Training (NCERT) should initiate steps to improvise school curriculum to include chapters on energy forms, conservation and renewable energy technologies (RETs).

Social responsibility of the target group of NPIC need to be enhanced to bring home to them, their role in achieving national goal(s), even though they cannot visualise any immediate direct benefit to them.