

**THE NEPAL AUSTRALIA FRIENDSHIP ASSOCIATION  
NAFA**

# **EVALUATION REPORT**

**FIRST PHASE IMPLEMENTATION OF IMPROVED  
COOKING STOVE PROJECT IN RI VDC, DHADING  
DISTRICT, NEPAL**

**Dr Deborah Setterlund OAM**



**14**

# **EVALUATION REPORT**

## **FIRST PHASE IMPLEMENTATION OF IMPROVED COOKING STOVE PROJECT IN RI VDC, DHADING DISTRICT, NEPAL**

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**Thank you to all who gave their time as interviewers, translators and respondents. Special thanks to Mr Kanchha Tamang for liaising, organising and assisting with recruitment of villagers and assisting with interviews. Thank you to David Brown and Chandra Tamang for initiating contacts with CRT/N and Dhading Forestry Department in 2012.**

## EXECUTIVE SUMMARY

1. This report provides an evaluation of the first phase implementation of ICS (improved cooking stoves) to 8 villages in Ri VDC, Dhading District, Nepal. The information was obtained using a survey of 35 householders in 8 villages, representing 90% of householders who had installed ICS as at late November 2014.
2. The NAFA evaluation complements a separate field survey conducted by Mr Karki from CRT/N in early November 2014
3. Recommendations arising from Mr Karki's survey:
  - Awareness program about ICS operation and its benefits needed.
  - Advice to use some *nigalo* pieces to help ignite fire, heat up the MCC (metal combustion chamber) and speed up the cooking process.
  - Awareness of kitchen management, regular maintenance, and cleaning of cooking pots and kitchen itself.
  - Provide installers with incentives to engage in promotion and installation of stoves continuously.
4. As of 24<sup>th</sup> November 2014, 45 ICS were installed in eight villages in Ri VDC
5. At January 2015, 90 ICS have been installed (as advised by Mr Kanchha Tamang).
6. Twenty of the 35 respondents reported receiving training in use of the ICS.
7. The ICS is used exclusively by 57% of householders; 43% (n=15) use the ICS as well as the traditional stove, for cooking food for cattle, food for a crowd, and for seasonal warmth in winter. Most Richet householders who live at the highest altitude report using both stoves.
8. The reported advantages of the ICS are:
  - wood use reduced by 30 – 50%
  - improved cooking efficiency
  - better health status, improved safety
  - improved household environment
9. Problems associated with the ICS:
  - Difficulty in lighting the fire and heating up the combustion chamber
  - Perceived extra maintenance
  - Problems with chimney
  - Difficulty in cooking dhiro (a type of mealy porridge)
  - As reported in 7) above, many villagers continue to use both ICS and traditional stove.
10. Strategies to address difficulties with ICS use arising from the findings:
  - Consider paying installers an additional 200 rupees (\$2.50 approx) per stove to encourage full time efforts to roll out installation of stoves at a faster rate.
  - Consider requesting CRT/N for a follow up field visit from Mr Karki to go ward by ward to problem solve and educate householders' issues with stove operation and kitchen management.

## INTRODUCTION

NAFA coordinates an integrated community development program in the Ri VDC of Nepal aimed at improving education, health, economic and environmental outcomes in 13 villages in the area. To achieve these aims NAFA members work in partnership with the Tawal based Hilly Region Development Club (HRDC) whose members represent villages in the area.

As early as 2011 the problem of deforestation and environmental degradation and the time taken to gather wood for cooking purposes from the community forest at Pasang Chowk was identified as a pressing problem by the HRDC. The use of wood-consuming traditional stoves for cooking poses a threat to women's health and the environment. A social health survey of Tawal residents in 2013 identified a range of health problems and household damage associated with traditional stoves. Continued use of the community forest without measures in place to reduce wood use and promote reforestation is unsustainable.

Discussion with the HRDC of these issues led to the formulation of a multi-strategy plan to for sustainable forest use. The plan involves:

- 1) Meetings with the Forestry Dept in Dhading to register Pasang Chowk as a community forest and to develop a forest management plan for the area.
- 2) Village family initiatives to replant private land holdings
- 3) Provision of Improved Cooking Stoves (ICS) (also known as 'rocket stoves' due to the metal combustion chamber) to 13 villages in Ri VDC.

A participatory plan and process was established with the HRDC to distribute and construct the ICS in multiple villages. To date the process has involved:

- **March 2012:** David Brown and Chandra Tamang meet with CRT/N (Centre for Rural Technology/Nepal) in Kathmandu and Forestry Dept, Dhading, to explore options around improved cooking stoves and reforestation.
- **Nov 2012:** NAFA members meet with CRT/N staff for briefing on improved cooking stoves.
- **Nov 2012:** multi-village community meeting in Tawal with over 300 villagers to provide information on ICS and assess villagers' interest in using ICS.
- **May 2013:** representatives from 9 villages travel to CRT/N in Kathmandu to learn about ICS and to decide on which type of stove to install (either metal or 'rocket stove').
- **May – Sept 2013:** choice of rocket stove made; register set up to collect money from villagers wanting stoves.
- **Oct 2013:** 70 ICS ordered
- **Nov 2013:** installer training in Tawal by Mr Karki from CRT/N and assistant. Fourteen men from different Wards of Ri-VDC participated in the training.
- **Nov 2013 – Nov 2014:** stove distribution and ongoing installation in 6 villages. Feedback from villagers indicates fire-gate (hole through which wood is fed into the combustion chamber) too small for efficient operation of stove.
- **Mar 2014:** second order for 70 stoves with larger fire-gates.
- **Early Nov 2014:** evaluation and Follow-Up conducted by Mr Karki.
- **Late Nov 2014:** evaluation of ICS by NAFA.

- **Dec 8<sup>th</sup> 2014:** meeting with Mr Karki at CRT/N to discuss evaluation outcomes and strategies to address problems experienced in operation of ICS in Ri villages.
- **Jan 2015:** Kanchha Tamang reports that 90 ICS have now been installed in 8 villages.
- **Jan 23<sup>rd</sup> 2015:** Kanchha reports HRDC has organised for Kanchha at Tawal, Bal Bahadur at Dhuseni, Nabraj at Ladap and Jagariya at Kutal to provide training to village women on how to use and clean ICS.

This report provides an analysis of a survey of householders currently using the ICS in 8 villages in Ri VDC. It complements and provides further insights into the use of ICS outlined by Mr Karki in his evaluation report, which is summarised in the following section.

## **CRT/N REPORT AND KEY FINDINGS**

Mr Damodar Karki, trainer from CRT/N, visited Ri- VDC in the first week of November 2014 for follow up, supervision and observation of ICS. It was found that out of 70 sets of stoves all were distributed in different Wards with the help of trained promoters. However, due to harvesting demands and the exit of some trainers who had gone overseas to work, only 34 stove units were installed at the end of October 2014.

The performance of 17 ICS was measured and inspected and a Field Survey of user's experiences of the stoves was conducted, comprising:

- General Inspection and Measurement
- Water Boiling Test (WBT)
- Controlled Cooking Test (CCT)



**Jumma Tamang, Damaodar Karki and promoter Jagariya Tamang during WBT test**

A summary of the observation study showed:

- 36 stoves yet to be installed
- A lack of awareness and promotional activities with many villagers unfamiliar with the ICS.

- Most ICS only partially used due to difficulty in starting the fire (the fire gate is perceived to be too small) and the time taken to get the combustion chamber hot and continuing to burn well.
- Most households lack awareness of kitchen cleaning and maintenance.
- Lack of chimney outlets due to the need of some villagers to smoke and blacken the bamboo strip (*nigalo ko choya*) used for making local baskets.
- Lack of good mud for brick making.

### **Recommendations arising from Mr Karki's evaluation**

- Awareness program on users about ICS operation and its benefits over traditional stove should be provided.
- Advice to use some *nigalo* pieces to ignite as after MCC (metal combustion chamber) becomes hot it speeds up the cooking process.
- Awareness of kitchen management, regular maintenance, and cleaning of cooking pots and kitchen itself.
- The promoters should be provided with incentives as a motivation to engage in installation of stoves continuously.

## **NAFA EVALUATION OF ICS**

The overall aim of the evaluation was to gain an understanding of villagers' experiences of the use of ICS. Specific objectives were to understand:

1. How and when the ICS is being used.
2. Any changes in health status as a result of ICS use.
3. Any changes in household environment as a result of ICS use.
4. Positive and negative aspects of ICS use.
5. Ideas about strategies for reforestation.

## **Methodology**

A survey questionnaire comprising 17 questions was used to collect the required information (see Appendix 1). The survey questions were based on relevant ICS literature and findings from a previous 2012 NAFA evaluation report on health issues in Tawal. Ms Jyoti Sharma checked the questions for ease of understanding and translated them into Nepalese.

The initial plan for Deb Setterlund to conduct the majority of interviews with the help of an interpreter in Tawal and nearby villages was adapted considerably in light of circumstances in the village setting. Due to the heavy involvement of women in the millet harvest, it was apparent interviews would need to be conducted at night time. The villages in the sample are located within half an hour to one hour (one-way) walking distance from Tawal. This meant Deb Setterlund was limited to Tawal and the nearby village of Dhuseni. Other interviewers were therefore recruited: grade 10 students, camp staff, Kancha Tamang, and health worker Sunita Tamang.

Having a number of interviewers resulted in some reduction in the quality of the information obtained, particularly missing data and the lack of deeper exploration of some responses. However, overall, the responses obtained suggest that the questions were mostly well

understood and provide a picture at one point of time of the positive and negative aspects of the roll out of the ICS in Ri VDC.

## Sample

Following Mr Karki's visit in early November 9 more stoves had been installed. As of 24<sup>th</sup> November 45 ICS had been installed in eight villages in Ri VDC: Tawal (6); Salleri (9), Dhuseni (6), Kutal (4), Ladap (2), Tishymarang (6), Shyaktali (6), and Richet (6). Of the 9 ICS installed in Salleri, 6 had just been completed and were not yet being used by the householder. These were therefore excluded from the sample.

Of the 39 active ICS users, 35 individuals were available to be interviewed, thus providing a final sample of 35 respondents, which represents 90% of households with ICS in use, across eight villages in Ri VDC.

Table 1 below provides an overview of the biographical data of the respondents.

**Table 1:** Sample numbers, gender, average number in household and highest level of education in each household

Village	No interviewed	Male	Female	Average no in household	Highest education level in household
Tawal	5	4	2	5.4	Grade 0-5: 21 Grade 6-10: 11 Grade 11- 12: 1 Bachelor level: 2
Salleri	3	2	1	5	
Dhuseni	6	3	3	4.8	
Kutal	4	2	2	7.2	
Ladap	2	-	2	5.5	
Tishymarang	3	3	-	4.6	
Shyaktali	6	3	3	5.3	
Richet	6	4	2	5.3	
<b>Totals</b>	35	21	15		

The average number of people in the households is 5.4. The level of education is quite low with the majority of people (n=21; 60%) having been educated to year five. Just three people have Post SLC or Bachelor level education.

## Location of villages in relation to forests for wood collection

Villagers from Tawal, Ladap, Dhuseni and Shyaktali use Pasang Chowk for wood collection. Ladap is the closest to Pasang Chowk, with other villages being of similar distance. Individuals from these villages (other than Ladap) take 12 or 14 hours to collect wood. Villagers from Kutal, Richet, Salleri and Tishymarang do not go to Pasang Chowk for firewood as it is too far (but do go there to cut large timber for house building). Instead, they go to nearby 'jungle' or collect wood from their own land.



## Length of time ICS installed, size of fire-gate and training

Respondents were asked how long the ICS had been installed, whether the stove had the smaller or larger fire-gate (the second order of ICS), whether or not they had received training in the use of the ICS and if so, who had conducted this training.

**Table 2:** Length of time ICS installed, type of ICS and identity of trainer

Village	Length of time ICS installed	Size of firegate		Training		Trainer
		Small	Large	Yes	No	
Tawal	One – 12 months	5	-	2	3	Mr Karki
Salleri	6 months	2	1		3	Missing
Dhuseni	7 days -	-	6	5	-	Installer
Kutal	7 days – 1 month	1	3	1	3	Missing
Ladap	One- 3 months	Missing data	Missing data	1	1	Installer
Tishymarang	4 months	3	-	3		Installer
Shyaktali	2- 5 months	1	5	1	5	Missing
Richet	3 – 9 months	6	-	6	-	Mr karki + Installer
Totals		18	15	20	15	

The data show that ICS have been installed for between 7 days to 12 months, with the average length of time since installation being 4.4 months.

Eighteen ICS with the small fire-gate and 15 with the larger fire-gate had been installed.

Twenty of the 35 respondents reported receiving training in use of the ICS, mainly from an ICS installer (14).



**Moulded clay parts being dried before assembly of ICS**

## Changed cooking practices as a result of ICS

All respondents said that they had changed the way they cook after using the ICS. Those who elaborated on these changes, referred to being able to cook 2 items at once and being able to continue to cook without wood, as shown in Table 3



**Table 3:** Changed cooking practices as a result of ICS

Themes	Tawal	Dhuseni	Kutal	Total
Can cook 2 items at once (eg dhal and bhaat)	1	4	1	6
After cooking, there is enough heat for cooking/boiling water without using more wood	1			1

### Use of traditional cooking stove

**Table 4:** Number of villagers who continue to use the traditional cooking stove

Village	Yes (do use)	No (do not use)	Comments
Tawal	2	3	"Use ICS to prepare the alcohol once a week" (Sunar, male)
Salleri	2	1	"Only in the case of emergency" (Bimila, female)
Dhuseni	-	6	
Kutal	1	3	"Mostly use the old stove" (Chosing, male)
Ladap	-	2	
Tishymarang	3	-	"Once a day to cook food for cattle" (Harka, male)
Shyaktali	2	4	"Don't use the old stove – it requires more firewood" (Parang, male) "(Use old stove) when cooking food for animals or for many people" (Tarku, female)
Richet	5	1	"Mostly I use the ICS, but when I have to cook food for animals in large volume, I use the old stove" (Sundar, male) "I use both stoves especially the old one in winter season and ICS in summer" (Saila, male)
Total	15	20	

The responses show that the ICS is being used exclusively by 57% of householders. Forty-three percent of householders (N=15) use the ICS as well as the traditional stove (n=15). The comments suggest that the traditional stove is mostly used for cooking food for cattle, food for a crowd, and for seasonal warmth in winter. Most Richet householders who live at the highest altitude reported using the old cooking stove.

These findings reveal greater exclusive use of the ICS than was reported in Karki's survey (out of 17 stoves inspected only 2 stoves were being used regularly and 11 stoves were partially used). This difference may be explained by the possibility that more householders were confident in using the ICS following Mr Karki's visit.

## **What householder like about the ICS**

Respondents made between two and five positive comments about the ICS. Respondents' comments are grouped under themes as follows, in order of frequency mentioned:

### ***Reduced wood use***

Across all eight villages, using less wood for cooking was the most frequently mentioned positive attribute of the ICS. Thirty-two respondents (91%) made this comment when asked what they liked best about the ICS. The importance of less wood use to villagers is supported by the fact that all respondents said 'yes' when later asked directly if they used less wood as a result of the ICS.

Respondents were also asked how often they now went to the forest to collect firewood. Of the 22 respondents who answered this question, 12 said they go once a week to collect wood, while 10 said they go twice a week. Several respondents said the ICS reduced wood use by half. The five Tawal respondents in this study reported that since installation of the ICS, they go only once a week to the forest to collect wood, which is half the average time of 2-3 times a week time indicated in the 2013 NAFA evaluation.

The villagers' views that the ICS reduces firewood use supports Karki's evaluation. Karki estimated that the traditional tripod stoves consumed an average 3 kgs per household per meal which is nearly double than consumed by the ICS. Karki's survey found that 30-50% fuel wood is saved after ICS installation.

The results of the NAFA and Karki evaluations show use of the ICS reduces wood consumption by 30 – 50 % and significantly reduces the number of trips per week taken to collect wood from forests.

### ***Cooking efficiency***

The responses show that householders believe the ICS is more efficient than the traditional stove in terms of 1) less time to cook meals/saves time 2) easier to cook 3) capacity to cook 2 items at once 4) enough heat available after cooking finished for boiling water without wood. Several respondents indicated they liked the hotplate and chimney.

"Saves time because it is not necessary to sit and watch pots" (Phul Maya, female, Dhuseni)

"It is reducing smoke so it is easier to cook" (Dami, male Richet)

"Because of the high heat, more food can be cooked in less time" (Sundar, male, Richet)

The responses indicate that the ICS makes cooking faster and easier. One person reported that it took less time to cook because of the high heat generated by the stove and another found that the ICS saves time since other tasks could be completed while cooking was underway.

### ***Better health status***

The majority of respondents (n=31; 4 not answered) identified improved health and safety as a result of ICS use. Respondents commented that the ICS produces less smoke which in turn meant less smoke related health problems:

“It (ICS) produces less smoke and reduces breathing problems” (Shova, female, Kutal).

“Less smoke ... no problems with breathing” (Uti, female, Ladap).

“Less smoke, no more coughs” (Kanchi, female, Ladap).

In addition to the comments regarding health raised by the respondents, data obtained from asking respondents specifically about any noted changes in health, show they thought their health had improved, as shown in Table 5.

**Table 5:** Changes in health status as a result of ICS use

Health problem	Improved a little	Improved a lot	Problem gone	Total for individual problems
Headache	9	12	9	30
Irritated eyes	10	7	9	26
Bad cough	10	4	12	26
Difficulty breathing	6	5	14	25
Sore throat	8	6	7	21
Chest pain	6	4	8	18
Totals for all problems	49	38	59	

The data on health outcomes is encouraging. The responses indicate that all health issues have improved, and in the majority of cases, smoke related health problems have disappeared.

“When we used the old stove, because of the smoke, we had eye irritation, throat problem and difficulty breathing. But after using the new stove we don’t have these problems anymore” (Sarmila, female, Richet).

“It is stopping breathing problem, cough and eye problem” (Purnima, female, Richet).

“Because of the ICS my health is improving and there is less chance of suffering from long-term problems” (Tarku, female, Shyaktali).

“No more problems in breathing, eye irritation and no headache. Don’t have any problem breathing due to less smoke” (Kanchi, female, Kutal).

“No problems anymore” (Prem Kumari, female, Tawal).

The following comments show the improvements observed by the respondents:

### ***Improved safety***

Three respondents mentioned that the ICS was safer for mothers doing the cooking and for their children:

“Safe for children because other parts not hot and only iron getting warm, so daughter can touch without hurting” (Kanchha, male, Tawal).

“While working in the kitchen there is less chance of burning hands or any other things” (Sundar, male, Richet).

“It stops getting burned and dark spots (on pots) (Purnima, female, Richet).



**ICS safer for women and children**

### ***Household cleanliness and food safety***

Several respondents commented that less marks on the walls and on utensils and less contamination of food from ash were aspects of the ICS that they liked:

“Less black marks on walls and pots” (Uti Maya, Ladap)

“While cooking on ICS food is not contaminated by the ash of fire or other dust from the fire” (Chosing, male, Kutal).

“Food is safe from ash and other dust from the flame” (Kanchi, female, Kutal).

“We don’t get any black on our hands while working in the kitchen (Saila, male, Richet)

“No more black spots on the wall” (Shova, female, Kutal).



### No more black marks on walls

These observations are reinforced by data obtained from asking respondents specifically about any observed improvements in household environment. Table 6 shows the responses of the 24 respondents who answered this question, in order of frequency mentioned.

**Table 6:** Extent to which household problems from smoke improved

Household Problem	No change	Improved a little	Improved a lot	No longer a problem
Smoke in house	-	2	9	14
Black walls	-	2	12	8
Dust in house	-	2	8	12
Ash in clothes	-	2	8	15

The results are encouraging. Based on the villagers' own observations it appears that all household problems associated with the traditional stove have 'improved a lot' or more likely 'no longer a problem'. This has positive implications for family health and the reduction of onerous household cleaning tasks usually undertaken by women.

### Problems associated with the ICS

Fewer respondents identified things they did not like about the ICS than things they liked. However, the problems reported are significant since they have implications for the exclusive use of the ICS.

#### *Difficulty in lighting the fire and heating up the combustion chamber*

There were seven comments regarding the small fire-gate and the associated difficulty of lighting the fire and heating up the metal combustion chamber. Five of these comments came from individuals who had the first issue of stoves with the smaller mouth piece; however, individuals with the larger hole also raised this problem.

“It takes time to light the fire and it is difficult to light the fire” (Dhiraj, male, Kutal, large fire-gate)

“Difficult to start fire, even with bigger hole” (Balsing, male, Dhuseni).

“Takes more time to start the fire” (Phul Maya, female, Dhuseni).

Since Mr Karki’s follow up visit, it may be that the problem of heating the metal chamber has been reduced to some extent at least in Tawal, where Kanchha Tamang has been active in promoting the stove and helping others to resolve stove related problems:

“At first it was difficult to heat up because of the small hole and the metal chamber gets cold. Mr Karki suggested using waste material first, the wood to make the fire. We have been doing that and now more easy. This has been explained to other people (Kanchha, male, Tawal).

### ***Perceived extra maintenance***

The second most mentioned problem (n=7) relates to maintenance of the stove, potential for breakage and possible costs of repair. Interestingly it seems that these are anticipated rather than existing problems, as the accompanying comments indicate:

“Especially I don’t like the maintenance, but up to date I have not faced that problem” (Parang, male, Shyaktali, ICS large fire-gate).

“Although it need maintenance, to date there is no problem” (Fila, male, ICS small fire-gate, Shyaktali)

“Since it is made of brick it has more chance of breakage and it is costlier to maintain” (Dami, male, ICS small fire-gate, Richet).

Mr Karki’s report confirmed that regular maintenance of the stove is needed and that ‘Few RS users clean stove regularly whereas others do it only on weekly basis’ (Karki Evaluation).

### ***Problems with chimney***

A few individuals mentioned a problem with the chimney in windy weather, as shown in the following comments.

“When it is windy the chimney doesn’t work properly” (Shova, female, Kutal).

“When the wind comes it is difficult” (Ashok, male, Richet).



Once again, following Mr Karki's visit, problems with the chimney in Tawal at least may now have been addressed:

“At first the wind blew the smoke back inside, but that has now been fixed with a tin cap” (Kanchha, male, Tawal).

### ***Difficulty in cooking: time taken and dhiro***

A few individuals mentioned a problem with cooking dhiro and taking more time to cook food, as shown below.

“The only problem is that it takes a little more time to cook the food” (Tarku, female, Shyaktali, large fire-gate).

‘Having problem with cooking dhiro” (Sundar, male, small fire-gate, Richet)

“While cooking the dhiro it is a little uncomfortable. Since it is made of clay it costs money to maintain it once it is broken” (Purnima, female, small fire-gate, Richet)

“It is uncomfortable and difficult to cook dhiro in ICS” (Saila, male, smaller hole, Richet)

Difficulties in heating the metal chamber and the time taken to raise the heat of the chamber were acknowledged by Mr Karki in his report: ‘The RS requires extra time to chop wood as small pieces are required for burning wood in rocket stove. Initially the RS burns slowly. However, once the metallic combustion chamber (MCC) becomes hot the fuelwood burns easily and cooking process becomes faster”. Mr Karki made a number of suggestions to users which according to Mr Kanchha have been adopted. It is likely that the small number of comments regarding the longer cooking time could relate to the length of time taken to heat the metal chamber

### **Who to go to for assistance with problems with ICS**

Most people did not answer this question. Of the 13 who answered, most (n=10) said they would contact the stove installer if they had any problems with the stove. Two said they would contact Balsing, who is a prominent leader in Dhuseni and one other said they would contact their neighbour. However, the fact that people plan to turn to the stove installers is potentially problematic, since according to Mr Karki not all stove installers are now available in the different villages since some have gone overseas for work.

### **Number of villagers who would recommend the ICS to others**

All 26 respondents who answered this question said they would recommend the ICS to other villagers.



## What is being done and what more could be done in villages regarding deforestation

Village	What is being done	What more could be done
Tawal	Planning phase of proposed reforestation program – now need to register with VDC Public awareness campaign for public to reduce tree cutting On private land, people are planting trees	<ul style="list-style-type: none"> <li>• More ICS installed</li> </ul>
Salleri		<ul style="list-style-type: none"> <li>• Reforestation</li> <li>• Conservation</li> <li>• Awareness of wildfire</li> </ul>
Dhuseni	Conservation of the forest Encouraging others to use ICS	<ul style="list-style-type: none"> <li>• More public awareness of forest conservation</li> <li>• Restoring the forest and making it the property of the community</li> </ul>
Kutal	Conservation program Using biogas Reforestation of bare land	<ul style="list-style-type: none"> <li>• Make the forest a community forest</li> <li>• Increase awareness of disadvantage of wildfire &amp; preventing wildfire</li> <li>• Preserve the forest and plant trees on bare land</li> <li>• Having a forest ranger</li> <li>• Making the boundary of the forest</li> <li>• Use steel rods instead of wood to make homes</li> </ul>
Ladap	Have formed a club to protect the forest Have decided not to cut the forest haphazardly	<ul style="list-style-type: none"> <li>• Forming a forest committee</li> <li>• Stopping wildfire</li> <li>• Reforestation</li> <li>• Not grazing cattle everywhere</li> </ul>
Tishymarang	Not answered	Not answered
Shyaktali	Conserving the forest Stopping deforestation Planting trees as they are cut: 'If we cut one tree, we should have to plant 2 or 3 more' Stop grazing cattle in the forest	<ul style="list-style-type: none"> <li>• Protect the forest from wildfire</li> <li>• Planting</li> <li>• Stop grazing cattle in the forest</li> </ul>
Richet	Encourage use of ICS Reforestation and conservation by planting trees	<ul style="list-style-type: none"> <li>• 'Everyone should use ICS ' because it uses less wood and stop cutting down the forest haphazardly</li> <li>• 'Not taking cattle here and there'</li> <li>• Reforestation on bare land</li> </ul>

The information on what villages are doing to stop deforestation shows a range of worthwhile activities, ranging from establishment of formalised groups to tackle the problems to less formal arrangements such as people planting trees on their private land. Many of the ideas and suggestions for what more could be done are quite innovative (eg a forest ranger; using steel instead of wood in building).

Nevertheless, further discussion regarding reforestation needs to occur with different village committees to determine the viability of suggestions, the extent to which ideas are being applied in practice and how far village committees have been able to progress plans to establish community forest groups. The latter involves complex bureaucratic processes which require determination to put into place.

## **Discussion**

The results of the survey show mixed outcomes in the use of the ICS across the eight villages. On one hand householders reported numerous advantages of the ICS over the traditional stove, many of which are reported in the literature on ICS usage in Nepal. On the other hand, the ICS clearly has not been adopted without difficulty and in just less than half the households surveyed, the traditional cooking stove is still in use for specific purposes. Based on the findings from this evaluation and the follow up report from Mr Karki the following conclusions are drawn:

### ***Positive aspects of the ICS:***

- Thirty-fifty percent fuel wood is saved after ICS installation.
- Trips to forest for wood collection considerably reduced.
- Health status of householders and household environment has and continues to improve significantly.
- Less chance of burns with ICS use for women and children.
- Many report faster cooking time.

### ***Negative aspects of the ICS:***

- Forty-three percent of householders in the sample are still using the old cooking stove, albeit less often than the ICS.
- There are problems with initial lighting of the fire and then producing enough flame to heat up the combustion chamber.
- Some reported slower cooking time (which may relate to problems in heating the chamber).
- Not all chimneys have been properly installed due to the practice of smoking bamboo for baskets.
- Some respondents reported discomfort in cooking dhiro and concerns about the robustness of the stove for the purposes of cooking dhiro.

## **Recommendations**

The problems identified from both sets of findings were discussed with Mr Karki in the CRT/N meeting of 8<sup>th</sup> December. Based on discussion of the results with Mr Karki and Kanchha Tamang, representing the HRDC, the following strategies and recommendations are made:

- 1) Consider paying installers an additional 200 rupees (\$2.50 approx) per stove to encourage full time efforts to roll out installation of stoves at a faster rate. Strategy suggested by Mr Karki as he found installers had to pay an assistant to assist with making mud bricks and pay someone to travel a considerable distance to collect mud.
- 2) Consider requesting CRT/N for a follow up field visit from Mr Karki to go ward by ward to problem solve and educate householders' issues with stove operation and kitchen management.

## APPENDIX ONE

### SURVEY OF IMPROVED COOKING STOVE USERS – Tawal 2014

1. Name of person answering questions \_\_\_\_\_
2. Number of people in this household \_\_\_\_\_
3. What is the highest level of education in the household \_\_\_\_\_
4. How many months has the new stove been in the house? \_\_\_\_\_
5. Does your stove have the larger hole for wood (**2<sup>nd</sup> CRT order**) yes no
6. Have you had any training in how to use it? Yes No If yes, who by?  
\_\_\_\_\_
7. Has the new stove changed the way you cook yes no

**If yes, can you describe the changes in the way you cook**

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8. Are you using your old cooking stove now Yes No

If yes, **WHY** and how often

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9. Since using the new stove, please rate the following health problems of your family members:

Health problem	Affected family members' name(s) & age(s)	No-one had this problem before	Problem is worse	No change	Improved a little	Improved a lot	Problem gone
Irritated eyes							
Headache							

sore throat							
Bad cough							
Difficulty breathing							
Chest pain							

**Any comments on any changes in health problems since new stove was installed:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**10. Since using the new stove please rate the following household problems:**

Problem	Never had this problem	Problem is worse	No change	improved a little	improved a lot	No longer a problem
Smoke in house						
Dust from stove						
Ash in clothes						
Blackened walls						

**10. Does the new stove use less wood than traditional stove**                                  yes    no

**11. Since using the new stove how many times a week do you go to collect wood**

\_\_\_\_\_

**12. What do you LIKE about the new stove? Please comment:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

13. What do you **NOT** like about the new stove (ask about any **PROBLEMS** experienced eg repairs needed, cost of repairs, cooking problems, chimney not working, etc )  
Please comment:

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14. Who will you go to (or have already gone to) if you have (or have had) a problem with the new stove? \_\_\_\_\_

15. Would you recommend the new stove to other villagers? Yes No

16. What are Tawal people doing to stop deforestation?

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17. What more needs to be done to stop deforestation?

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