

Impact Evaluation Improved Cook Stove Program Laos

Executive summary

Promoting access to clean, efficient and safe cooking facilities is a persistent development challenge. Globally, it is estimated that up to 2.8 billion people are reliant upon traditional biomass – primarily firewood and charcoal – as their principal source of energy for cooking, and this is associated with a multitude of negative health, social and environmental impacts. In Lao PDR, it has been estimated that up to 90% of households rely on solid biomass as their primary source of energy for cooking and the use of traditional, unimproved stoves with efficiencies as low as 24% remains widespread, while unsustainable charcoal production contributes to depletion of forestry resources.

With this in mind, SNV, with funding from EC Switch and led by Oxfam Novib, is in the process of implementing a six-year “Improved Cook Stove Program” which is currently in its second phase (2013-2016). The rationale underpinning the intervention involves working with local partners to strengthen value chains in order to facilitate the development of a sustainable market for ICS in Lao PDR. In collaboration with the Lao Association for Rural Mobilisation and Improvement (ARMI), the Lao Women’s Union (LWU) and the Government of Lao PDR, the program is delivering activities including producer training, the establishment of testing facilities and promotion/awareness-raising campaigns. With funding from Blue Moon Fund, the EU, SNV and the Asian Development Bank (ADB), SNV is also undertaking capacity development services to ARMI; this is a key aspect of the program’s sustainability approach.

This evaluation was commissioned to assess the effectiveness, impact and sustainability of the ICS program. It focused on six units of analysis corresponding with the program’s areas of activity: producers, testing facilities, distributors/retailers, consumers, strategic partners (ARMI) and the enabling environment. The evaluation focused on the three main provinces targeted by the program so far (Vientiane capital; Savannakhet; Champasak) and adopted a mixed methods approach, including document review and field visits to make observations and collect primary qualitative data. For the quantitative component, a rapid survey led to the identification of 276 ICS using households and 324 ‘control’ households using traditional stoves. A consumer survey was undertaken with these households along with a 3 day Kitchen Performance Test (KPT) to compare charcoal consumption of the ICS and control households. Electronic Stove Use Monitoring Systems (SUMS) were also deployed in a sub-sample of the households to further identify stove usage patterns.

- *Producers*

The anticipated result of producer engagement was to facilitate 15 small and medium sized enterprises (SMEs) to produce 100,000 high quality ICS by 2016. Despite a slow start, targets are now being met and even exceeded; it is estimated

that based on current production volumes, the overall target of 100,000 will be met by 2016. The evaluation found that producers have been provided with appropriate training and equipment to enable the production of ICS. Overall, high levels of satisfaction were found with the support provided by the program, as well as with the quality of products. Four producers have now switched to producing only ICS, indicating the viability of ICS production as a business.

The evaluation findings question whether producer profit margins are sufficiently high, however. Support provided through the program includes subsidised access to tools and facility improvements through matched funding, and paying for the costs of testing and label printing. In order to ensure sustainability of ICS production beyond the program, these costs will need to be absorbed by the producers but current prices do not appear to facilitate that. The program also intends to develop a greater role for the producers in quality oversight in order to ensure that quality remains high beyond the program lifetime, which given the current level of ARMI's quality control efforts (at least weekly producer visits) seems a necessary if ambitious strategy. It is establishing producer groups for this purpose, but this activity is in its early stages and the evaluation recognised that further capacity building will be required. The continued monitoring of the effectiveness and viability of this approach is also recommended.

- *Testing Facilities*

The programme sought to establish five government-led testing centres to independently verify the quality of the ICS produced. Two testing centres have been established at government premises and a third, in Champasak, is hosted by ARMI but staffed by government staff. The evaluation found that adequate testing equipment has been provided and testing procedures and protocols developed. The evaluation found that testers have been well trained and clear protocols have been established. Stoves from each producer are subjected to mandatory laboratory testing on a quarterly basis. Very low failure rates suggest that the level of producer training and quality control mechanisms provided by the program are being effective. The costs for the tests themselves, however, are currently borne by the program; this needs to be addressed going forward.

The evaluation found that the program's approach to establishing testing facilities has led to government capacity which should be sustained beyond the program, as long as demand is continued for testing services by ICS producers. The intention is for this to be part of a '4-tier' quality control approach, which alongside quality oversight by producer groups, relies on quality related feedback from retailers and consumers. The centralised call centre has already facilitated this and the evaluation saw evidence of its effectiveness; in the short-term it should be continued by ARMI.

- *Distributors /Retailers*

The overall objective of this program component was to enable up to 150 SME retailers across the five targeted provinces to successfully promote ICS through

improved marketing strategies. Program activities included awareness raising, retailer training and promoting sales record keeping. The evaluation found that that at least 600 retailers are now known by ARMI to be selling ICS. Varied levels of ICS understanding and sales volumes amongst retailers suggest that the program needs to focus more strongly on retailer training and incentivisation, however. There has also been limited success in encouraging retailers to collect customer data. From a retailer perspective, the prospects for sustainability appear good. Retailers set their own prices for ICS, and sales volumes and repeat orders indicate that retailers continue to profit from selling ICS. However, the relatively high wholesale costs of ICS mean that small businesses are unable to hold large volumes in stock – they are therefore vulnerable to supply chain bottlenecks, emphasizing the importance of minimising delivery times from producer to retailer.

- *Consumers*

Consumers are at the heart of the ICS program logic, as both the intended beneficiaries and integral agents in the causal pathway. The program's market-based theory envisions demand from informed consumers driving the production and distribution of high quality ICSs. After substituting traditional stoves with ICS, and assuming no other significant change in cooking patterns, consumers should experience reduced fuel consumption, broader environmental benefits, and reduced user workloads, time and expenditure burdens.

The evaluation found that efforts to raise awareness of ICS among consumers have been largely successful. Evidence gathered indicated that consumers are convinced of the product's merits in comparison to traditional cook stoves, particularly in terms of fuel savings, stove durability and ease of use due to its predictability. The involvement of the Lao Women's Union in prompting awareness appears to have been a particularly effective partnership.

Based on laboratory efficiency test results, the evaluation concluded that ICS certainly offers increased efficiency for users in comparison to traditional cookstoves. SUMS data and the consumer survey indicated that consumers make frequent use of ICS, although often alongside continued use of traditional cookstoves. The consumer survey and focus groups showed a strong perception amongst users that ICS have delivered significant charcoal savings for them and this is likely to be amplified for the many (around 17%) of ICS users who use them for commercial cooking. Previous Kitchen Performance Tests (KPT) undertaken by SNV have also demonstrated the potential of ICS to generate charcoal savings for users, but the results of the KPT undertaken for this evaluation were less conclusive due to high levels of variability in the dataset. This may have been due to methodological design, but it also means that some 'rebound effect' cannot be ruled out. This is where the availability of a more efficient stove leads to more intense usage, thereby reducing anticipated fuel savings but still providing users with the other benefits of ICS. Its durability, for example, appears to be a key selling point and providing buyers with considerable financial savings through reduced frequency of replacement stove purchase.

The evaluation also included a brief study on charcoal manufacturing in Lao PDR. Weighing of input wood and output charcoal from the mud kilns which are typical in Lao PDR indicated low conversion efficiencies, a finding supported by published literature. This implies that savings in charcoal consumption translate into significant wood savings, and also suggests that there is opportunity to promote more efficient charcoal production. The consumer survey also indicated that electricity and LPG are available in some urban and peri-urban areas of Lao PDR; further analysis would be required to understand the appropriateness and feasibility of promoting their use more widely as cleaner cooking solutions.

- *Strategic Partners*

The program aimed to build the capacity of ARMI, the primary strategic partner, in order for the organisation to be well-placed to oversee a scaled-up ICS program. The evaluation team found that SNV's objective of supporting ARMI to manage to manage the program in an increasingly independent manner is appropriate and on track, with ARMI now managing it on a day-to-day basis in a largely effective manner. ARMI has further demonstrated its emerging leadership of the ICS program through successfully conceiving and introducing several changes to the program's operations. The evaluation also found that ARMI had developed sound human resource and financial management practices, with indications that SNV's support has contributed to this and improved ARMI's resilience to staff turnover. There is limited evidence of ARMI taking an active role in research and design of cookstoves, but ARMI has developed significant technical capabilities related to ICS, particularly in producer support, quality assurance, and promotion and marketing.

- *The Enabling Environment*

Underpinning the ICS program logic is an assumption that a market based model is fit to deliver the intended results. In general, market-based approaches to ICS promotion are considered best practice and inherently promote sustainability, assuming that subsidisation is avoided. The evaluation therefore finds the program design to be appropriate, but underlines the need for testing and labelling costs to be passed on the producers. The program has been reviewed favourably by its funders who deemed it both highly relevant to national priorities and grounded in sound intervention logic.

Although the evaluation team finds that a market-based approach is an appropriate model for distributing ICS in Lao PDR, it is also noted that it presents a challenging context, including shortcomings in national systems and mechanisms for setting, monitoring and enforcing product standards. While the program's design includes mechanisms for quality assurance, this particular aspect of the program's sustainability will be influenced by an eventual transition to a reliance on national infrastructure.

There is evidence to suggest that the program has generated a stronger national interest in stove design, with the government organisation RENMI now undertaking independent research into cookstoves. Based on analysis of the potential growth in

charcoal usage and the favourable reactions of consumers so far to ICS, the evaluation team expects that demand for ICS is likely to be sustained. Imported stoves are not viewed as a particular threat to the ICS market, but locally made low-quality replicas with alternative labels have already emerged as a potential challenge. The findings that consumers are able to recognise the now registered 'thumbs up man' ICS TradeMark is therefore encouraging, but it is also recommended that the program tried to absorb producers of replica stoves.

Program-wide conclusions

Effectiveness

- There is a high level of ICS production in three provinces, with a fourth quickly emerging. The program is on track to meet its overall production target of 100,000 ICS by 2016.
- Support provided to producers, in the form of training and the initial subsidisation of tools and equipment, has been successful. Barriers to further scale up by producers include lack of access to finance and low profit margins, and lack of access to transport for some.
- Two testing centres have been established to oversee the quality of production, and these are well staffed and follow reliable testing procedures. Testing results point to a high quality of ICS overall. However, a government-hosted testing laboratory is still required in Champasak province, and the program's payment of test fees needs to be addressed.
- There has been significant retailer interest in ICS, with over 600 retailers stocking and selling ICS. Engagement with retailers for the purposes of training, incentivising sales and promoting the collection of consumer data has been more limited than envisaged in the program design, however, and needs to be given increased focus.
- Consumers of ICS are convinced of their value but awareness and accessibility continue to be a barrier to wider purchase; the evaluation did not find current prices to be a barrier for most existing or potential buyers.
- SNV's efforts to build the capacity of ARMI has been highly effective, with ARMI demonstrating considerable leadership in several areas, and now managing the ICS program on a day to day basis.

Impact

- Consumers using the ICS are convinced of their value, and in particular with their durability and predictability vis-à-vis their traditional counterparts; these in turn lead to financial and time savings for users.
- Laboratory tests conclusively show that ICS offer increased efficiency compared to traditional cookstoves. Findings during field visits and previous studies indicate that this also leads to charcoal savings for ICS users. Though Kitchen Performance Tests undertaken for the evaluation did not point to the expected level of fuel-savings, results ought not to be considered conclusive due to high variability. Some 'rebound effect' should not be discounted, however.

- High reported levels of ICS usage for commercial cooking suggest there may also be significant charcoal savings not assessed by the KPT.

Sustainability

- Sustainability considerations were embedded in the program's design, as evidenced by the market-based approach, strong engagement with government bodies from the outset and a clear focus on building the capacity of the national strategic partner. The evaluation recommends that support is continued, however, to build further on successes to date.
- The sustainability of the program is enhanced by the strong likelihood of continued consumer demand for ICS, suggested by: a) high sales volumes to date; b) high levels of satisfaction with ICS and: b) high and increasing proportion of households using charcoal as a primary fuel source for cooking.
- A key question regarding the sustainability of the program pertains to quality control mechanisms, the costs of which are currently borne by the program. Although the program has promoted government engagement in ICS and led to a national standard, it is too early to rely on government assurance of the ICS standard. More time is therefore required to continue the program's efforts to develop sustainable quality control systems.
- Another key question pertaining to sustainability regards the viability of the business model independent of any subsidisation. At present, the program bears certain operation costs, including testing and label printing. These will need to be absorbed into the supply chain but this will only be advisable with an increase in wholesale price. The evaluation findings suggest that this will not significantly affect consumer demand, but may reduce retailer interest. Given also that awareness of ICS is still being raised, a price increase should therefore only be introduced gradually and alongside increased retailer focus.

Summary of operational recommendations

Pricing

- Provide better price guidance to retailers, to make pricing more consistent for customers.
- Undertake a more detailed pricing study with a view to promoting a price increase for producers in the medium-term.
- In time, increase ICS price so that producers can take on costs currently subsidised by program, including for testing and label printing.

Scaling up production

- Consider establishing a low interest loan scheme managed by ARMI to allow existing producers to further scale up production.
- Investigate increasing the product range, particularly to include a festival-size stove.
- Design a more efficient tool for creating holes in stove grates.

- Encourage ICS producers to make tools and deliver training as an extension of their business.
- Take steps to support metal bucket production by drawing it into the program.
- Consider transport options to address producer transport constraints.

Quality control

- Prioritise resolving the issues around establishing a DST stove testing centre in Champasak province.
- Consider testing more representative numbers of ICS, to reflect varying production levels/maturity across producers.
- Gradually move testing and label printing costs to producers.
- Maintain central call centre with phone number on labels, as a key part of promoting retailer and consumer feedback on quality, as well as facilitating retailer orders.
- Continue to develop producer groups, with long-term intention of taking on role of quality control oversight, operating call centre etc., but continuing to monitor the effectiveness of this approach given its ambition.

Increasing retail

- Create a brief, clear guide for retailers on how to promote ICS to consumers.
- Provide new retailers with a demonstration ICS for them to use themselves.
- Introduce an incentive scheme for retailers, to encourage sales and record keeping.
- Consider ways of embedding the ICS benefits into sales approaches.
- Gather more systematic feedback from retailers, LWU and promotion events to inform retail and marketing strategies going forward.
- Investigate other retail channels further e.g. petrol stations, MFIs, employer-schemes.
- Introduce measures to reduce delivery delays from producers to retailers.

Ongoing support

- Move towards more centralised support from SNV to ARMI. ARMI should be encouraged to establish an ICS program manager role, and this should eventually become the main channel through which SNV support is provided.
- Prioritise the continued development of sustainability mechanisms for existing market activities, including producer groups, 4-tier quality control mechanism and moving retailers towards ordering ICS directly rather than being telephoned by ARMI/LWU to make orders.
- Continue to promote the institutional architecture for national ICS standards (including for a larger range of designs) and a stronger government role in standard enforcement.

Measuring impacts

- Investigate what KPT methodology may be most appropriate given the contexts in which ICS are being used in Lao PDR.
- Undertake a study specifically focussing on the emission saving benefits of using ICS for commercial cooking.

Summary of strategic recommendations

- Introduce woodstove ICS through the approach and market framework established by charcoal ICS program.
- Investigate further the viability of supporting increased sustainability of solid cooking fuel supply, for example through promoting the production of biomass briquettes.
- Continue to consider cooking technologies with greater health impacts through reduced smoke emissions.

