

Using social marketing tools to increase fuel-efficient stove adoption for conservation of the golden snub-nosed monkey, Gansu Province, China

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SUMMARY

Fuel wood is a key source of energy for many families in developing areas of China. Fuel efficient stoves are often identified as a win-win solution for forest protections and public health/development in China and across the globe. However, the communication and connection between stoves and biodiversity conservation has been less clear, by both those who are promoting their use as well as those adopting the technology. Social marketing is the application of marketing principles used to sell products applied to “sell” ideas, attitudes, and behaviours to benefit the public good. The Campaign to Protect the Sichuan Golden Snub-nosed Monkey in the Yuhe Nature Reserve, Gansu Province, China, was initiated in 2008 in an effort to inspire communities to protect forest habitat in the reserve, and quickly adopt fuel-efficient stoves. Results of this study show significant increases in knowledge, attitudes, and interpersonal communication pre and post campaign (16 – 49 percentage points). Post-campaign (within 1 year) results concluded 28.0% and 43.1% of those surveyed within 1 year of and 2.5 years adopted the technology. For those households that adopted fuel-efficient stoves, consumption and gathering time were reduced by 40.1% and 38.2% respectively. Finally, preliminary research suggests that adoption of fuel-efficient stoves also lead to a reduction in forest destruction, with a 23.7 % reduction in the number of newly felled trees in areas where the stoves had been adopted by greater than half of the surrounding community. The results of this study suggest that social marketing can be an effective tool for improving community knowledge and attitudes, decreasing destructive behaviour, and reducing threats to biological important forests in China.

BACKGROUND

Fuel wood is a key source of energy for many families in developing areas of China (Demurger and Fournier 2007). According to a recent review by Demurger and Fournier (2007), firewood and straw still account for two-thirds of rural household energy use, for both heating and cooking, in China (Jiang and O'Neill 2004). As such, wildlife species that rely on unfragmented forest areas may be negatively impacted by human activities and habitat loss. For example, Bearer *et al.* (2008) found that timber harvesting and fuelwood collection have significant impacts on forest habitat use by giant panda (*Ailuropoda melanoleuca*) that last decades after harvest activity.

International development organizations, like the Global Alliance for Clean Cookstoves, consider fuel-efficient stoves a win-win solution for forest protection and public health challenges. While, adoption rates of fuel efficient stoves have been associated with household income (wealth), stove efficiency, and fuelwood price (Amacher 1992) the connection between stoves and biodiversity conservation has been less clear. Given that economic and livelihood incentives are affected by numerous exogenous factors, it is not surprising that the connection between fuel efficient stoves and forest protection is tenuous at best.

The tools and theory for developing social marketing campaigns for wildlife conservation were developed and tested in the late 1970s with the Saint Lucia Parrot (Butler, 1988, Jenks *et al.* 2010). Butler (1988) used tactics from corporate

marketing to create a brand and local pride for the species. These techniques relied on the development of social marketing materials and communication tools such as billboards, posters, songs, and sermons, as well as the parrot as the flagship species or campaign mascot. Through training and partnerships, these approaches have been implemented to address biodiversity threats across the globe, and have been tested and refined based on quantitative impact assessments and the latest research from the social marketing literature (Jenks *et al.* 2010). Critical for testing and refining these tools is the creation of a campaign theory of change (see Conservation Measures Partnership 2009), which provides a template or hypothesis about how the action leads to changes in knowledge, attitudes, interpersonal communication, behavior change, threat reduction, and conservation results (Jenks *et al.* 2010, Figure 1).

Social marketing, or the application of marketing principles used to sell products applied to “sell” ideas, attitudes, and behaviours to benefit the public good (Weinreich 2010), has been identified as a potential tool for engaging communities on the adoption of fuel efficient stoves. Although social marketing tools may be effective for increasing the adoption rate of fuel-efficient stoves, these tools are often used to develop adoption strategies geared toward messages unrelated to conservation. Thus, social marketing with conservation objectives may offer a viable alternative for both increasing the speed of stove adoption as well as connecting communities more explicitly with long-term biodiversity outcomes. Rural Chinese communities exist at a critical intersection of carbon emissions, human health, and biodiversity conservation where social marketing may be effective for achieving multiple objectives.

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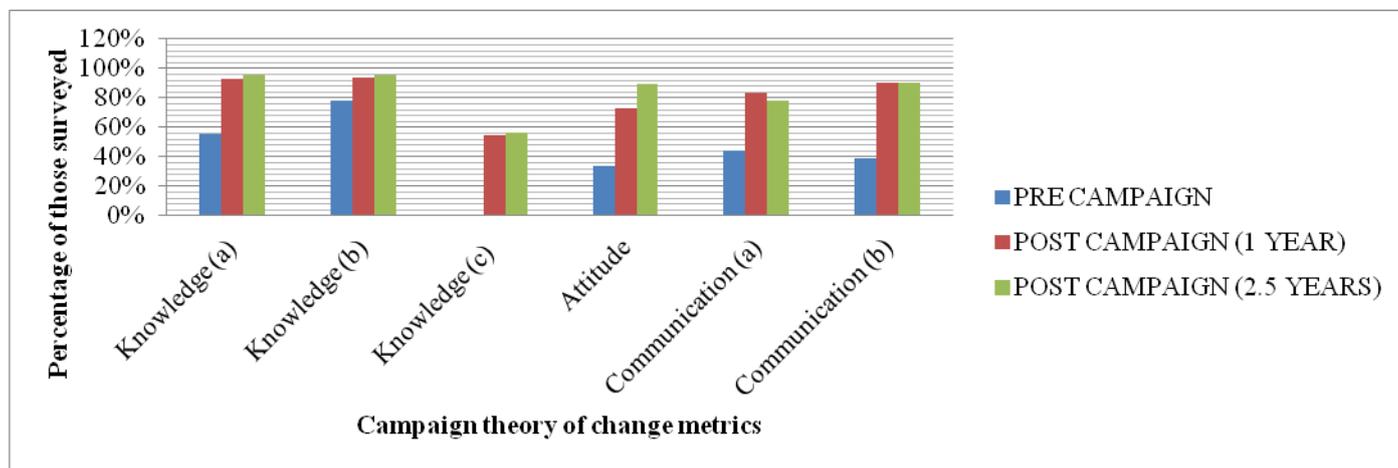


Figure 3. Results from sociological surveys conducted in communities across the campaign area where campaign theory of change metrics represent the following: Knowledge (a); villagers who know the advantages of fuel efficient stoves; Knowledge (b); villagers who know that overconsumption of fuel wood is leading to the destruction of the forest; Knowledge (c) villagers who know that over-consumption of fuel wood is leading to the national park's decline; Attitude; villagers who would like to pay for the building of fuel efficient stoves; Communication (a); villagers who talked about forest conservation; Communication (b); villagers who have talked about the benefits of efficient stoves. All differences pre and post campaign (1 year) were significant (Chi-square significant at the 95% confidence level or higher).

remaining fuel wood was weighed to estimate fuel-wood consumption.

Forest destruction and fuelwood collection were monitored in forested areas near three types of villages: where greater than 50% use of fuel efficient stoves ($n=6$), less than 50% use of fuel efficient stoves ($n=6$), and no efficient fuel stoves ($n=6$) are used. Fixed sampling lines were set around the villages with a 10m×10m fixed quadrat set on the sampling lines every 50m rising in altitude. The varieties, quantities, volume and canopy density of trees, storage of fuel wood on sampling lines, signs of human activities and wood cutting outside quadrats were recorded. Final measuring indexes are quantity preservation rate, biodiversity index and forest growing stock.

CONSEQUENCES

Shifts in community knowledge and attitudes: Baseline values pre-campaign suggested that key areas of knowledge were high, including the potential benefits of a fuel efficient stove as well as the fuelwood collection impacts on forest

destruction (range 56-78%). None the less there were significant increases in knowledge, attitudes towards adopting fuel efficient stoves, and interpersonal communication pre and post campaign (1 year) (range 16-49 percentage points) (Figure 3). knowledge and attitudes stayed at the same level or slightly greater after 2.5 years of the campaign, while communication about the benefits of stoves slipped slightly. Comparison sites surveys suggested that the shifts in community knowledge, attitudes, and communication observed at the campaign site could be attributed to the campaign (Table 2).

Behaviour change and stove adoption: Pre campaign baseline surveys suggest that only 12% of the target communities were using fuel-efficient stoves. Post-campaign (within 1 year) results concluded 28.0% of those surveyed had adopted the technology. Post-campaign results within 2.5 years demonstrated even more impact, with 43.1% of households reporting using fuel-efficient stoves (Chi square significant at 99% confidence level).

Table 1. The detailed Theory of Change for the Yuhe Nature Reserve Pride campaign, outlining the campaign objectives along all components: Knowledge, Attitude, Interpersonal Communication, Barrier Removal, Behavior Change, Threat Reduction and ultimately, Conservation Result.

Knowledge	Pride Campaign increases community residents' awareness of the environment issue of fuel-wood felling, the health issue of using traditional stoves and the benefits of fuel-efficient stoves.
Attitudes	Pride Campaign increases communities' willingness in using fuel-efficient stoves. Campaign improves communities' identification in adopting measures to reduce fuel-wood felling.
Interpersonal communications	Pride campaign stimulates discussions among target audiences about fuel-efficient stoves and environment protection.
Barrier removal	Cooperative partners technically support community in building fuel-efficient stoves. Pride Campaign provides subsidies for fuel-efficient stoves.
Behaviour change	Community residents utilize fuel-efficient stoves in their daily lives.
Threat reduction	The community fuel-wood consumption starts to decline.
Conservation results	By October 2015, the biodiversity and forest quality of Yuhe Reserve will improve significantly (compared to pre-project, the biodiversity index will rise and the forest growing stock is increasing).

Fuelwood consumption and forest impacts: Average fuel-wood consumption for each fuel-efficient stove was 0.76kg, while the average for conventional (Tiger) Stove was 1.71kg. Therefore fuel-efficient stoves used 66% less wood, saving 0.95kg fuel wood. Monitoring of household fuelwood use confirmed this efficiency, with average household fuelwood consumption 40.1% less for fuel-efficient compared to conventional stoves. Gathering time for fuel wood was reduced by 38.2%. Forest monitoring revealed a 23.7% reduction in fuel wood felling in forests surrounding villages where fuel-efficient stoves were used in place of conventional stoves (29 stumps as opposed to 38).

DISCUSSION

The results from this study suggest that social marketing techniques can be an effective and powerful tool for fostering acceptance and adoption of fuel-efficient stoves, and lead to a reduction in destructive fuel-wood collection in nearby forests. The impact of this campaign on key enabling conditions for behaviour change suggest that it was particularly successful in increasing knowledge, attitudes, and interpersonal communication within just 1 year of campaign implementation. Additional forest and fuelwood use monitoring also suggests that the campaign was able to decrease destructive forest practices as well as reduce the direct consumption of fuelwood. Although these results only reflect 1-2 years of data collection,

it is encouraging to note that knowledge, and attitudes remained stable over this time period. Interpersonal communication, or discussion among peers and opinion leaders to validate new knowledge and attitudes, has been identified as a critical component in fostering and maintaining changes in behavior (Vaughan and Rogers 2000). Future campaign activities will likely need to continue to maintain knowledge, and attitudes, but explicitly focus on enhancing discussion among peers about the benefits of using stoves as well as the importance of conserving healthy forests. This action is focused more explicitly on a product with multiple benefits (fuel-efficient stoves). It would be interesting to test whether this type of social marketing campaign is more effective than those with less tangible benefits (e.g. private land certification; see Green *et al.* this issue).

Finally, one of the critical elements of the structure of this

Table 2. Shifts in knowledge, attitudes, and interpersonal communication (See Figure 3) as measured at a comparison site. Percentage point differences were negligible, and suggest that observed increases at the campaign site can be attributed to the campaign.

	Comparison Pre-campaign (n=300)	Comparison Post-campaign (n=300)
Knowledge (a)	56.0%	57.1%
Knowledge (b)	67.3%	64.3%
Knowledge (c)	2.0%	2.1%
Attitude	56.0%	57.1%
Interpersonal communication (a)	67.3%	64.3%
Interpersonal communication (b)	56.0%	57.1%

campaign is the ability to test a hypothesis about how changes in audience knowledge, attitudes, and communication influence behaviour change and the reduction of threats to biodiversity. Few education or outreach campaigns explicitly document or test an explicit theory of change. The approaches detailed here, including a specific theory of change, quantitative surveys, and the use of comparison sites, provide a valuable framework for understanding the impacts of social marketing or other types of outreach activities on target communities.

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