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Exploring the Impact of Providing Alternative Technology Products in Remote Tibetan Communities

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ABSTRACT

In the remote North-Eastern corner of the Tibetan plateau in the Western Chinese province of Qinghai, ethnic Tibetans spend many hours each day gathering yak dung, wood and other fuel substitutes necessary for heating, making tea and cooking. Over the past 7 years extreme cold (-35^{0}C) and drought has had a significant debilitating effect on the environment upon which the nomadic people and the livestock depend. The use of solar cookers as a partial substitute for dung, wood, bushes and straw can help to alleviate some of the negative effects. This paper explores how introducing solar cooker technology has benefited not only the natural environment but also positively enhanced the quality of life of the Tibetan and Monguor people in 48 villages. This paper reports on work carried out between 2003 and 2005 by the author and students from Qinghai Normal University (supported by the Canada Fund). Written reports, translated letters, interview commentary and personal observations provided a rich database that was analyzed using the 'Wordsmith' textual data analysis software. The findings demonstrate that significant benefits are accrued to both the environment and remote community recipients. Furthermore, it is argued that providing solar cookers can make a positive contribution toward the culture of the Tibetan and Monguor people.

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General geography (Tibetan plateau) and Economy

The Tibetan plateau (Qinghai-Xizang (Chinese)), is the youngest (3000 million years), largest (750,000 sq. km) (Jones 1996) and highest plateau in the world with an average elevation of 4,700m (Peissel 2002).

The climate is cold and dry with precipitation averaging from about 200 - 400mm per year in the south to as little as 25mm per year in north. The northern areas comprise mountains, vast basins, and rolling plateau of non-arable alpine meadow. In addition to mountains, the central and southern plateau is characterized by wide river valleys more suited to the growth of barley, oats and other staple dietary food products. The above factors impact greatly on the lifestyle of the Tibetan people with arable agriculture and the herding of domestic animals such as yak, goat, sheep, horses and cattle providing for the main basis of their economy (Jones 1996).

Economy

More than 40% of the Tibetan ethnic population is involved in herding activities (Smejkal 1990, c.f. Jones, 1996, p.56). The nomadic diet is dependent on dairy and meat produce not only for personal consumption, but also as a basis of trade. Trade of butter, meat, hides, wool, and surplus livestock for barley, sugar, tea, rice and vegetables is the norm and generates a per person equivalent material income of about CNY 200–400 (Chinese Yuan) per year (USD 30-60) (Webb and Stuart 2007). Similar to nomadic pastoralists elsewhere, the Tibetan nomad is not totally self-sufficient. Living at such high altitudes and being geographically removed from direct access to staple dietary products such as tea and tsampa[1], an economy involving trade is essential (Jones 1996).

Recent history, implications and local conditions

Between the years 1996 to 2001 the people of the remote predominantly Tibetan region of Yushu, Qinghai suffered some of the worst weather conditions in recorded history (Webb and Stuart 2007). Three years of extreme cold was immediately followed by two years of drought. The combined effect of these conditions led to the destruction of much of the immediate local ecosystem with many pastoralists reporting a loss of 80 – 90% of their livestock (yak, sheep etc.) (Webb and Stuart 2007). The ecological effect of these conditions has negatively impacted the nomads whose livelihood is heavily reliant on livestock related trade (wool, milk, meat). An annual income of about US $30-60 per person is insufficient to replace lost livestock (Webb and Stuart 2007). These conditions have rendered much of the local population destitute.

While no single solution will solve the problem, a number of locally developed and managed initiatives are in place. Among these is the introduction of alternative technology solutions designed to improve the quality of life of remote communities. Geslin (2001) points out that such initiatives have been essential and frequent in the history of all societies. One such technology initiative, the provision of solar cookers, has the potential to replace dung and other biomass fuels, the depletion of which has made life very difficult for the Tibetan people.

The potential benefits from the provision of solar cookers have been reported elsewhere (Xiaofu 2004). This study aims to explore these benefits in greater detail focusing specifically on the socio-cultural and environmental implications of introducing such products to the region.

Solar Cookers

The number of solar cookers in use in China has increased from 2000 in 1979 to nearly 630,000 in 2003, making China the number one adopter of solar cooking technology in the world (Xiaofu 2004). Solar cookers have particularly gained ground in areas where a lack of firewood and other traditional fuels such as dung are witnessed. In some remote areas it is reported that farmers have had to burn grass, tree roots and other poor burning, smoke producing materials to cook, boil water and provide warmth during the colder months (Stuart et al. 2003).

While three main designs of solar cooker exist, the most prevalent design adopted in China is the semi-parabolic dish which sits on a metal stand. The advantages of this design are its low cost and ease of use, transportation, and maintenance. The inside of the dish is lined with a vacuum aluminum planting membrane (VAPM) used to channel

[1] Roasted ground barley is the traditional cereal of Tibetans. It is served in a bowl and mixed with hot tea, dry cheese, butter and, if desired, sugar.

intense heat to a boiling pot suspended on a further metal stand about one meter above the dish. Sunlight is attracted to the dish by mechanically angling the dish vertically and horizontally toward the sun (Webb and Stuart 2007). Sufficient heat is generated under appropriate conditions to boil one liter of water in about 9 minutes.

The following general benefits from solar cooker adoption have elsewhere been suggested (Xiaofu 2004):

Economic benefits: - The economic impact of solar cookers has been found to vary between regions. Xiaofu (2004) reveals that "solar cookers save anywhere from 600-1000 kilograms of fuel wood per year, or 380-560 kilograms of fuel straw". The author further points out that "depending on the price and availability of cooking fuel in a given region, frequent use of a solar cooker can save anywhere from CNY 35 in Qinghai to upwards of CNY 600 RMB per year in the Tibetan Autonomous Region (T.A.R), where cooking fuel is more expensive."

Social benefits: - Solar cookers provide labor saving advantages in that they reduce the amount of time spent collecting wood and other potential fuel sources (Xiaofu 2004). Solar cookers also provide direct health benefits in that people living in poor areas are reliant on having rice in cold water for lunch, instead of more nutritious meals reliant on a fuel source to heat them up (Xiaofu 2004).

Ecological benefits: - A maladjusted ecological environment is mostly caused by human activity. Resources such as plants and trees removed for burning cause erosion with the period of repair often proving lengthy. Secondary benefits are also evident. Straw for example, that might have been used as a fuel for cooking could also be used as an organic fertilizer thereby enhancing the effectiveness and quality of farming (Xiaofu 2004).

Study

From the previous account it seems evident that local conditions can be improved with the introduction of solar cookers. From the author's experience gained over four separate visits to the region during the period 2003-2005, the potential benefits appear many. Given the above discussion and presentation of suggested benefits, it seems timely to explore more rigorously the potential contribution that solar cooker technology can make toward enhancing the overall quality of life of the Tibetan people. Adopting a case review approach, this article explores the benefits that have been witnessed following the introduction of solar cooker technology in 48 remote villages, four monasteries and two schools since 2003. Objective 1 (below) offers a frame of reference for this exploratory approach and objective 2, the potential to provide further insight concerning the cultural impact of solar cookers.

Objective 1: To explore the extent to which the introduction of solar cookers to Yushu prefecture can improve the perceived conditions of the Tibetan people living in remote communities.

Objective 2: To offer some insight concerning whether the introduction of solar cookers can positively contribute toward the sustainability of the Tibetan culture.

Methodology

Design

During the period 2002 – 2003, 1787 solar cookers were provided as part of a Canada Fund[2] sponsored initiative to 41 Tibetan villages (1427 households), seven Monguor villages (188 households), four Tibetan Buddhist monasteries (160 monks) and two Tibetan schools (around 250 students and two teachers). At the conclusion of the project[3], 10,000 residents were benefiting from the initiative. All solar cookers were provided following the preparation and successful submission of a proposal from each community. Each proposal was prepared by village representatives in conjunction with a project manager[4], government representatives and a local NGO[5] in the specific case of the Yushu prefecture. Villages participating in this project were located across an extensive geographic area covering not only Qinghai but also Sichuan, Gansu and the Tibetan Autonomous Region.

At the conclusion of each project, i.e., when the provision of solar cookers to a collective recipient (village, monastery, school etc.) was finalized, a comprehensive report was submitted to the Canada Fund. Each report included a detailed diarized account of each project, letters of thanks (original plus a translation into English) from the village leader or other designated leader from each recipient group (n = 39) and a translated interview commentary from a number of solar cooker recipients. This documentation comprising of over 31,000 words of text provided for the sample of words to be explored as part of this study.

Research Design & Analysis

The manipulation of textual data during analysis has been described as an "eclectic activity void of a one best way approach" (Tesch 1990, cited in Scharl 2000, p 305). A goal of this particular study included the identification of ways in which ethnic Tibetans perceived the provision of solar cookers to have improved their living conditions.

While many excellent qualitative text analysis tools are available, 'Wordsmith', a text software-based tool useful for general content analysis, was employed to achieve the above goal. Wordsmith (www.lexically.net) supports three types of analysis: 1. *Word list generation*, which produces a list of all words in a text, set out in alphabetical or frequency of occurrence order. 2. *Keyword analysis*, which detects words of unusual high frequency vis-à-vis a reference corpus. 3. *Concordance and Collocation analysis*, which displays any word or phrase in its immediate context and enables the analyst to search

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[2] Details of the Canada Fund can be found at canadafund@cccsu.org.cn.

[3] The project was implemented by: one Monguor and 39 Tibetan students from the English Training Program, Nationalities Department, Normal Qinghai University under the guidance of Dr Kevin Stuart; Dr. Limusishiden, a long-time partner of the Canada Fund, in Huzhu Mongghul (Tu) Autonomous County, Qinghai Province; and Mr. Zhu Yongzhong, also a long-time partner of the Canada Fund and Director of the Sanchuan Development Association, in Minhe Hui and Mangghuer (Tu) Autonomous County, Qinghai Province and the Snowland Service Group, Yushu Tibetan Autonomous Prefecture, Qinghai Province.

[4] Project managers comprised mostly of students from the English Training Program at the Nationalities Department, Normal University, Qinghai. Many were originally from the villages in which the student was acting as 'project manager'.

[5] Snowland Service Group (Director: Mr. Rinchen Dawa).

for occurrences of a particular phrase in the text. This study adopted all three forms of analysis and these are discussed in greater detail below.

Word list generation

Prior to commencing analysis of the data within Wordsmith, a preliminary procedure of data cleaning was conducted. This stage ensured that the data to be imported into 'Wordsmith' were textually correct (without spelling and other potential errors). Once this procedure was satisfactorily complete, the data were then imported into Wordsmith as a *txt file and a list of words together with the frequency count for each produced. This procedure of data cleaning was followed a number of times with each iteration resulting in the removal of what this author describes here as textual noise. Textual noise was defined as any data unit with a high usage frequency that contributed little to the meaning of the data. Words such as *the, of, in, is, a, are* etc. were included among these. In addition, using a rule-based algorithm, words were grouped together based on their different inflections (Figure 1). Verb forms were put into the infinitive, nouns into the singular, and elisions removed (Lebart 1998, cited in Scharl 2000). At the conclusion of this process, 2106 differentiated textual units were produced.

Figure 1 – Example of Wordsmith produced word list with lemmatization

N	Word	Freq.	%	Texts	%	Lemmas
1	VILLAGER	450	0.99	1	100.00	villager[166] village[278] villager[6]
2	COOKER	388	1.52	1	100.00	cooker[255] zhuoni[1] cooker[131] zhou[1]
3	SOLAR	373	2.22	1	100.00	solar[372] zhoma[1]
4	CATERPILLAR	351	0.02	1	100.00	uinan[3] forest[46] guinan[3] forest[46] guinan[3] forest[46]
5	THEY	257	1.53	1	100.00	
6	HAVE	182	1.09	1	100.00	
7	FROM	180	1.07	1	100.00	
8	THAT	179	1.07	1	100.00	
9	WE	179	1.07	1	100.00	
10	FUEL	169	0.81	1	100.00	fuel[135] fuels[34]
11	CAN	149	0.89	1	100.00	
12	FAMILY	149	0.62	1	100.00	family[104] family[38] family's[7]
13	VERY	144	0.86	1	100.00	
14	TIME	138	0.78	1	100.00	time[131] times[7]
15	THEIR	133	0.79	1	100.00	
16	MY	132	0.78	1	100.00	my[131] myself[1]
17	COLLECT	131	0.45	1	100.00	collect[75] collected[15] collecting[36] collection[5]

Key word analysis

The purpose of keyword analysis is to locate and identify characteristic words in the text. The frequency of words in the text is compared with their frequency in a reference set of words, usually taken from a larger corpus of text (Scharl 2000). The corpus of text adopted for this study was a 2 million word sample of spoken and written text taken from a range of sources and designed to represent a wide cross-section of current English words (British National Corpus). For each word occurring in the sample, Wordsmith calculates and cross-tabulates the frequency of that particular word and the total number of words in both the sample and the reference corpus (Scharl 2000). When the 'appearance' frequency of a word in the analysed text is significantly different from that of the reference corpus, it is considered characteristic (Scharl 2000). The key words are presented in order of significance (Figure 2), with significance determined by means of a Dunning's log likelihood test and, the chi-square test with Yates' correction for a 2 x 2 table. In total, 290 significant key words were identified. Figure 2 below reveals a number of the most significant based on their 'keyness'. A word is said to be 'key' if it occurs in the text at least as many times as a specified minimum (in this case 10) and, its frequency in the text when compared with its frequency in the reference corpus is such that the statistical probability is smaller than or equal to a specified p value, in this case p = < 0.05 (www.lexically.net).

Figure 2 – Key word listing

N	Key word	Freq.	%	RC. Freq.	Keyness	P
1	Solar	372	2.22	144	4,167.23	0.00
2	Cooker	255	1.52	32	3,072.70	0.00
3	Villager	166	0.99	16	2,021.66	0.00
4	Project	120	0.72	248	1,075.52	0.00
5	Fuel	135	0.81	536	1,059.94	0.00
6	Collect	131	0.45	316	1,030.76	0.00

Concordance and Collocation analysis

Concordances are used to enrich the interpretation of key words by locating them in the immediate context in which they occur (Scharl 2000). A concordance is produced by "searching and rearranging specific target words (selected from the key word list) in their immediate context within a text" (Tesch 1990, p 80, cited in Scharl 2000). Concordance displays are the basic data set from which more sophisticated representations such as word clusters, dispersion plots or collocation displays (a tabled count of words appearing to the left and right of selected key words) can be generated.

Collocation enables the analyst to identify words that occur in the neighborhood of selected key words (i.e., *neighborhood collocates*), thereby enabling lexical patterns to be identified. In Figure 3 below, a collocation display reveals neighborhood collocates for 'cooker' in decreasing frequency order. Beside each word, the total number of times it co-occurred with the search word in the list of concordances is displayed. This is followed by a separate display for the total occurrences left and right of the term. The remaining columns show how many times the word appeared *n* words to the left and *n* words to the right of the word. Values in the central column (*), which indicates the position of the search term, are given a value of zero. Repetition of concordance and collocation analysis for a number of identified significant key words enables the researcher to gain detailed insight into the textual data.

Figure 3 – Collocation display

N	Word	elation	Total	otal Left	al Right	L5	L4	L3	L2	L1	Centre	R1	R2	R3	R4	R5
1	SOLAR	0.000	160	140	20	5	6	1	0	128	0	0	9	2	3	6
2	COOKER	0.000	151	10	10	2	2	5	0	1	131	1	0	5	2	2
3	PROJECT	0.000	30	2	28	0	0	1	1	0	0	21	3	2	2	0
4	FOR	0.000	26	8	18	1	3	4	0	0	0	3	5	3	6	1
5	THAT	0.000	20	9	11	2	2	0	5	0	0	5	0	2	4	0
6	THEY	0.000	17	7	10	0	6	1	0	0	0	4	2	1	2	1
7	CAN	0.000	16	2	14	1	1	0	0	0	0	6	1	4	1	2
8	EACH	0.000	15	12	3	3	3	3	3	0	0	1	1	1	0	0
9	FROM	0.000	15	8	7	1	1	2	4	0	0	2	0	0	2	3

A combination of the above approaches enabled a rich investigation of the text. The following section details the findings from the analysis.

Findings

A review of the reduced text set following repetitive concordance and collocation analysis across identified key words enabled the author to interpret the results to identify a number of key themes (categories) in the data. Table 1 reveals six main solar cooker benefit themes. The revelation of these themes expands on the three benefit themes suggested earlier in this paper i.e., *'economic'*, *'ecological'* and *'social'* (Xiaofu 2004). Based on their content, the six main themes identified in alphabetical order have been given the labels *'economic'*, *'education'*, *'environment'*, *'health'*, '*social-personal'* and *'time'*. Sub-themes include combinations of the main themes. The textual content of each theme represents a selection of commentary taken from the text.

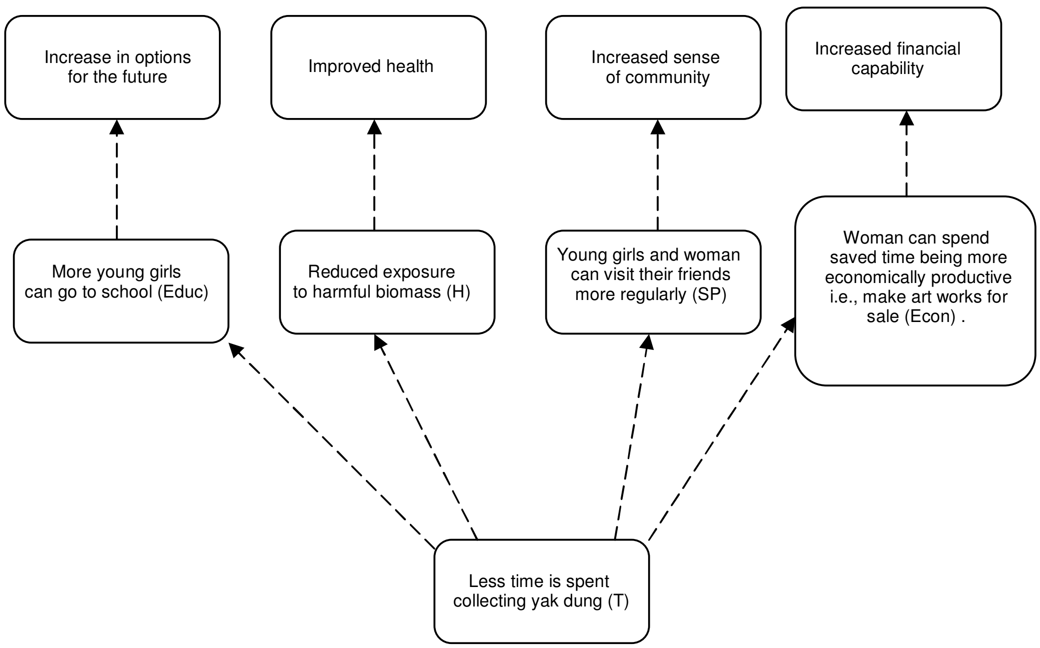
Table 1 – Benefits identified following analysis using Wordsmith 4.0

(Econ) Solar cookers save families money that can be used to pay for other much needed items.
(Econ) Milk cows give more milk because they can drink warm water.
(Econ) Monk's families do not have to send them so much fuel so their lives are easier now than before.
(Educ) Girls can now go to school.
(Env) Less organic matter is taken from the forest mountains.
(Env) Solar cookers decrease the use of organic fuel.
(Env) Solar cookers limit deforestation.
(Env) Solar cookers limit erosion.
(Env) Solar cookers produce less hazardous smoke.
(Env) Straw can now be used to feed livestock.
(Env) The environment around the monastery is clearer because there is less ash in the air.
(Env) The mountain will be greener because less grass, fewer leaves and fewer branches will be taken from it.
(Env) Villagers burn less firewood and straw.
(H) Because washing is more regular, bodies are healthier and people don't get so sick from dirt.
(H) Food such as potatoes, bread and meat can now be cooked in a more hygienic way.
(H) Impoverished elderly village woman who do not own donkeys used to have to carry dung on their backs for long distances. With solar cookers they no longer have to.
(H) Less ash in the air is better for people's eyes.
(H) Less work needs to be done in a smoke-filled kitchen.
(H) Solar cookers improve women and girls' health by decreasing the time that they are exposed to the harmful effects of dung collection.
(H) Solar cookers improve women's health by decreasing the time that they are exposed to the harmful effects of smoke-filled rooms.
(H) The burden on woman to collect organic fuels is now greatly decreased.
(H) When women and girls reached steep mountainous forests, donkeys were unable to navigate the climb with the load on their backs. Woman had to carry the load on their backs instead. This led to poor health and body deformity. Now they no longer have to.
(H) Women and girls have been collecting the bekhum bush because of diminishing forest resources. The bush has a poisonous substance that harms the collectors' faces. Now they no longer have to collect bush.
(SP) It is easier to boil water to cook simple items such as potatoes.
(SP) It is easier to wash clothing because of the availability of warm water.
(SP) Straw can now be used to heat the Kang (Sleeping platforms).
(SP) There is more space in rooms because they do not have to store dung, straw and firewood.
(SP) Bathing is easier and more frequent because of the amount of hot water available.
(T) Less time is spent collecting yak dung.
(T) Villagers are able to easily boil a kettle of water now in 9 minutes.
(T) Women and girls have more time to do other things as they spend less time now collecting fuel.
(T) Monks do not have to waste time burning straw, dung and firewood.

Key: Econ = Economic; Educ = Education; Env = Environment; H = Health; SP = Social-Personal; T = Time;

The identification of non-mutually exclusive themes in this study is the result of a process of inquiry that includes both the analysis discussed above and the author's interpretation of data based on his experience and discussion with others in the region. The adoption of a simple benefits means-end chain model laddering technique (Gutman, 1982) can demonstrate the interrelatedness of themes (Figure 4).

Figure 4 – Example of benefits laddering and theme interrelatedness



Economic

This theme focuses on the economic advantages of owning a solar cooker. They include alleviating the need to collect and/or purchase yak dung, the price of which is becoming more expensive as demand surpasses supply potential.

Education

As a direct consequence of not having to collect dung, some children are able to attend school. It is worth highlighting that the opportunity to attend school, which is in fact a national requirement, is not available to all children. The remoteness of some communities and the non-presence of schools in these areas contribute toward the impossibility of attendance. However, where schools are present, the need to assist with family chores such as collecting dung, water and tending to yak can often prevent young children from attending school. This is particularly so in the case of young females who mostly assist with the 'collection' chores mentioned above. Young boys, always the second born male, will often be exposed to a monastic education comprising Buddhist philosophy, epistemology and debate.

Environment

Yak dung provides for a natural source of nutrition for the soil. The availability of nutrition is reduced as the amount of dung decreases. This occurs directly because of reduced livestock numbers and/or dung removal by humans for use as a fuel source. The depletion of soil nutrient impacts on seasonal pasture growth upon which reduced livestock numbers are dependant. The above evidences a vicious ecosystem effect because, in turn, the population is also dependant on the livestock for their existence. Thus at a simple level it can be seen that the provision of solar cookers provides some respite to the above negative ecosystem effects.

The benefits described with respect to the remaining three themes have to do with how recipients benefit on a more social level.

Social-Personal

The benefits discussed by respondents in this theme include those that can be described as domestic task related, such as boiling water for use in making tea, taking a bath, washing clothing, and cooking food. It is not uncommon to experience Tibetan nomads drinking upwards of 50 cups of tea per day. With butter added the tea becomes a major source of sustenance and inner warmth with temperatures as low as -35C. Similarly, with temperatures often cold enough to freeze water, the prospect of a bath is less than welcoming. Access to hot water can go some way toward addressing this point of reluctance, with hot baths and subsequent cleanliness impacting potentially positively on health. This is likewise the case with the use of hot water for washing clothing whereby hot water is better able to rid pitted clothing of germs that thrive in the cold.

Health

Attesting to the relevance of the ‘health’ theme with respect to the burning of bio-mass fuels, a recent World Health Organization report on the global health situation (Desai, Mehta and Smith 2004) reveals:

- Smoke from burning solid fuel constitutes one of the major risks relating to death and disease.
- One third of humanity (2.4 billion people) relies on burning solid fuels such as wood, crop residues, charcoal and dung.
- Indoor pollution from burning solid fuels kills three people per minute or, 1.6 million people per annum (predominantly woman and children).
- Acute respiratory infections, pulmonary disease (chronic bronchitis), lung cancer, asthma, tuberculosis, low birth weight, infant mortality, and cataracts have been linked to the burning of solid fuels.

Given that without a solar cooker up to nine hours a day can be spent breathing in smoke given off by burning yak dung, it would be logical to argue for the benefits of not having to do so. Solar cookers emit no such harmful emissions and consequently can be considered a positive health contribution.

Time

The benefits in this category, closely related to the aforementioned, include those that make a direct contribution toward enabling recipients to enjoy greater leisure as well as other individual and community pursuits through the provision of greater discretionary time. For example, one recipient highlighted this in an interview by excitedly expressing the possibility of being able to visit friends now that they had a little more time. Similarly at the community level, this author has witnessed the formation of a dance and music theatre group who with time to rehearse are now able to play out Tibetan mythology to large audiences at special religious fests.

This study has explored the potential contribution that solar cooker technology can make toward enhancing the overall quality of life of the Tibetan people, particularly those living in remote communities. In addition, it sought to demonstrate that the state of the local environment could be vastly improved with the introduction of solar cookers. From the results presented above, objective 1 has been achieved.

Objective 2, which sought to offer some insight concerning whether the introduction of solar cookers can positively contribute toward the sustainability of the Tibetan culture, is covered next.

This study reveals that while the introduction of solar cookers makes a significant difference to the lifestyle and activities of remote Tibetan populations, it does not wholly replace the necessity for what might be described as more traditional lifestyle practices. Thus, the collection of dung, firewood and other resources for cooking, boiling water, bathing and washing clothing is still a necessary and significant part of life for the Tibetan people. In this sense, the introduction of solar cookers, rather than having a detrimental effect on culture, actually serves to support and enhance the local culture. The additional time available to female members of the community in not having to spend in some cases six hours a day collecting resources to burn, can be spent engaged in other culture-promoting activities such as receiving an education, participating in dance, music and theatre, and producing art and craft items (e.g., clothing and Thangka paintings) for sale.

From the text analyzed in this study together with the author's personal experience, there was no evidence to suggest that the introduction of solar cookers impacted negatively on local culture; indeed, only the positive effects of solar cooker introduction could be identified.

Summary and Conclusions

In the remote North-Western Chinese province of Qinghai (Tibetan plateau), the Tibetan and Monguor people struggle to gather yak dung, wood and other fuel substitutes for heating, boiling and cooking; the basic necessities for survival. Over the past seven years, extreme cold (-35^{0}C) and drought has had a significant effect on the environment, the nomadic people and the livestock upon which these people depend. The environment has become increasingly denuded and many nomads are caught in a vicious cycle of poverty. The use of solar cookers as a partial substitute for dung, wood, bushes and straw can help to alleviate this cycle.

Based on an extensive exploration of over 31,000 words of text, this paper has presented the results of a program to introduce solar cookers into 48 remote community villages, four monasteries and two schools located on the Tibetan plateau. The findings reveal that significant benefits accrue both to the environment and to remote community recipients. This article argues that rather than impacting negatively on a culture, solar cookers have the potential to make a positive contribution toward sustaining the culture of the Tibetan and Monguor people.

Turning briefly to 'consumption', it was pleasing to note how knowledgeable solar cooker recipients were of the negative consequences of 'non-sustainable consumption practices' i.e., using depleting natural resources as a fuel source. It was similarly pleasing to hear how with genuine concern the preference of recipients was for the adoption of consumption behaviors that ensured minimal impact. This possibly explains to an extent their openness to accept solar cooker technology. Perhaps one shouldn't be too surprised by these observations given that the nomad people have lived symbiotically together in and with their environment for centuries. At a macro level, consumers of all goods and services globally can benefit from the adoption of this same protective attitude. It is not that an extreme attitude of non-consumption is prescribed, though in some cases demarketing may be beneficial. Rather, an attitude directed more toward wise and sustainable consumption practices ensures longer term continuity, benefit and social prosperity.

In this and other similar regions, tens of thousands of families would like to similarly benefit from receiving a solar cooker. With a life expectancy of about 10 years, the advantages to each recipient will be accrued many times over in a solar cooker's lifetime. However, though the cost of a solar cooker stands at just USD$25, it is nonetheless beyond the purchase power of most Tibetan families. Consequently, to fund an increase in their availability and distribution many project proposals have been prepared by the local Yushu based NGO (Snowland Service Group) and submitted to potential sponsors globally. In more developed consumption driven societies it is conceivably difficult to imagine how for relatively little financial outlay so much can be achieved. As the potential contribution of solar technology becomes more widely recognized, it is hoped that the task of funding the provision and distribution of such products will increase in prevalence. It is in this light that it is hoped that other researchers will be inspired to consider work in the area. The more evidence available regarding the benefits accrued from the provision of solar cookers, the greater the likelihood that potential funding bodies will be inspired to increase the volume and frequency of their assistance. However, this study has only just touched the surface toward that end and indeed is not without its limitations.

First, the methodology employed (the analysis of report data) can be described as rudimentary. Further, more thematically structured qualitative interviewing of solar cooker recipients would undoubtedly provide supporting testimony not only of the benefits of solar cooker introduction, but also address questions regarding the existence of any negative cultural impacts. Second, from the data and methodology employed in this study it is not possible to rank benefits in order of importance. Further studies directly exploring the relative importance of identified benefits would make a timely contribution to knowledge. Third, with respect to textual analysis, clearly many ethnographic software tools are available and future studies may benefit from the adoption of one of the other perhaps more rigorous software tools. To conclude, a longitudinal study exploring the benefit themes in greater detail, together with an exploration of the interplay between themes across diverse communities, would contribute significantly to our knowledge of the effects of alternative technologies on the quality of life of the people living in remote impoverished and fragile regions.

Special request from the Authors – The authors invite readers to provide a Tibetan family with a solar cooker by donating the funds necessary for purchase. One solar cooker costs about USD$25 and will last a family about 10 years. Read this paper to find out what a huge difference a single solar cooker can make to a family and the environment. Then, contact the second author at kevin.stuart@gmail.com to obtain bank account details. See www.thdl.org/community/pdfs/Spencer2006.pdf for the results of a similar project. We are currently fundraising for 39,600 RMB (approximately 5,000US$) to provide solar cookers to 360 Tibetan homes in Hualong County and in Hainan Tibetan Autonomous Prefecture in Qinghai Province, PR China. Just consider the value in your USD$25 to a Tibetan family accrued over ten years.

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