

Design for all

A co-design experience in rural India for healthy indoor cooking

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Abstract

For many women in rural India spending several hours a day cooking over an indoor open stove is the norm. What these women fail to realize is that there is a dangerous killer in their kitchen: burning biomass fuels causes almost 500,000 deaths every year in India alone.

What can creative design do to help these women continue with their traditional culture, while empowering them to select a way of cooking that does not endanger their lives?

This paper illustrates an initiative built up within Philips' global design community, where employees used their capabilities to face important current social and environmental issues and, in the paradigm of open-innovation, to provide a concrete context-specific humanitarian answer to one such issue.

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1. Background

We are currently living in an increasingly complex, inter-connected and fragile world characterized by population growth, globalization, political instability, social and economic inequality, and environmental degradation. These trends are transforming our society and our economy: sustainable development is no longer an option, it is imperative. Companies with long-term economic ambitions must find new ways to continue being competitive in the saturated markets of advanced economies, but they also need to learn how to flourish in emerging and developing markets that represent a growth opportunity for the coming years (Prahalad 2005: 3-21).

In order to address the 'un-met' needs of low-income people in emerging and developing economies, creative thinking, system views and open innovation seem essential nowadays. Standard process and product related eco-efficient practices cannot, on their own, provide competitive and valuable answers (Hart 2005, 85-104). The challenge is to create accessible and affordable solutions that match local infrastructural and economic conditions and socio-cultural preferences, without expanding the current use of environmental resources. To face this challenge, new and appropriate business and design practices are necessary to define effective and sustainable growth trajectories.

Within this search, a promising path is emerging: a mutual value creation process between companies and local stakeholders who have a deep understanding of specific contexts, issues, and opportunities; an 'intensive listening' to the 'voice' of potential target communities, families, and individuals (Simanis, Hart, Enk, et al. 2005, 5-13). Pioneering activities of this type are initiated in various ways. Companies that aim to become truly sustainable, and develop propositions for 'underserved' people, often use social investment budgets while on their journey of learning.

The tendency is to replace traditional cash donations - to organizations that deliver a variety of social and environmental benefits - with activities connected to internal competencies and with specific actions carried out by employees. The conviction is that humanitarian projects, conducted with a business-like approach, can generate both value to society and competitive assets (Porter and Kramer 2002, 1-14). They can support socio-economic and environmental causes, but they can also serve as laboratories to develop new, sustainable solutions, new insights into resolving societal problems, and new ways of working.

2. Introduction

It is against this background that this paper intends to illustrate how to leverage design and research capabilities to create a common vision of sustainable development, and to translate this vision into context-specific humanitarian solutions. To do so, it draws on the experience built up within Philips Design³, one in which employees worked together in a large-scale design workshop, and on a local follow-up activity.

Using this experience, the paper aims to:

³ Philips Design is the design service unit of Royal Philips Electronics. It covers 11 locations around the world, with a total of 550 professionals from more than 30 nationalities. Its creative force embraces disciplines as diverse as product, interaction and web design, sociology, anthropology and socio-cultural trends research.

- provide an overview of the design process and tools used to inform, inspire and engage the creative ‘sustainability’ thinking of 275 designers and researchers challenged to confront global sustainable development issues, and a variety of ‘quality of life’ topics affecting people on very low incomes;
- describe the open innovation approach adopted for the implementation - in rural and semi-urban India - of one of the design concepts generated during the creative phase: the ‘Chulha’, a stove for healthy indoor cooking co-developed with various local stakeholders and end-users. The stove is designed to combat sickness and death due to indoor air pollution from cooking with biomass fuels, but also to stimulate the formation of local groups of entrepreneurs to produce and distribute it.

The paper starts with a summary of the initial design workshop, defined in terms of scope, structure, participants and type of research input. It continues with a description of the methods used to gather information, generate users’ insights, and consolidate knowledge. It then illustrates the design tools and criteria used to generate ideas.

Along the way, it moves from concept-design to concept-development and piloting by describing: the approach used and the stakeholders involved in carrying out the project in India; the current project status; achievements/obstacles; next steps, including scaling-up activities.

It concludes with a few reflections on the learning from the project, and on a few thoughts regarding the specific contribution of design towards sustainable development.

3. Raising awareness, stimulating creative thinking

In September 2005, the Philips Design global community came together in Eindhoven for a one-and-a-half day workshop entitled ‘A Sustainable Design Vision - Design for Sense & Simplicity’, in an attempt to rethink charitable donations beyond financial sponsorship. The workshop, which followed the Philips’ themes of social investments (Philips 2005) – access to healthcare, wellness and education – aimed to explore directions and opportunities for innovative humanitarian propositions that would express our company’s mission⁴, and would consider:

- internal competencies, technology and know-how, combined with external, complementary expertise;
- people’s needs and aspirations manifested in various regions of the world, and more specifically, in their contexts-of-life.

The aim was to come up with products and services able to support Non-Governmental Organizations (NGOs) in relieving the suffering of people in emergencies (resulting from natural disasters), or enhancing individual empowerment and the socio-economic development of local communities at very low income level.

In preparation for the workshop, a core project team, comprising design innovation, environmental science, user’s research and socio-cultural trends capabilities from headquarters and a few regional branches, was assembled to conduct six months of extensive research and organizational activities. To create enthusiasm within the Philips Design community for the coming event, three packages of material designed to promote communication were distributed several months in advance. The material introduced the setting, aim and ambitions of the event and provided examples of innovative companies’ humanitarian actions to tackle environmental and social challenges. Such challenges were brought to life at the opening of the workshop

⁴ Philips’ mission states: “*Improve the quality of people’s lives through the timely introduction of meaningful innovations*”.

through speeches given by representatives of three international Non-Governmental Organizations (NGOs): Médecins Sans Frontières, Save the Children and Light Up the World⁵. They described the problems encountered in their work, using touching, real life stories.

During the event, the 'Design Times' internal newsletters, which offer additional informative and inspirational input, were used to guide the creative process towards the specific challenges to be faced. The users targeted in the creative brainstorming sessions were representing the most fragile categories of our societies, including children and women living in remote rural areas, elderly people living alone in urban spaces and low-income workers in suburban areas of highly populated cities: all affected by specific diseases / mental wellness issues, or with learning and educational access problems. Such issues were identified by desk and field research, and by the NGOs that participated in the workshop. Gaining the insights of real people was the primary task in preparing for the event. It was our belief that only through a deep understanding of people's real needs and aspirations in their physical and socio-cultural environments would it be possible to create a solid opportunity for meaningful and sustainable design interventions.

4. Gathering people insights for a human-focused design

Qualitative and quantitative data gathering focused mainly on emerging and developing socio-economic contexts in which Philips operates: Latin America; Eastern Europe; Russia; India; China. Issues that came under the spotlight included, for example, malnutrition, pneumonia, malaria, sanitation, water purification, air pollution and environmental degradation, energy consumption, lighting, and illiteracy. The selection of issues to be tackled was defined by their urgency, as indicated by the quantitative data collected from various sources. Methods used for data and knowledge gathering included:

- desk research into the databases and reports from international aid organizations, scientific environmental institutes, and sustainable development trend-watchers (UNESCO 2005; UNICEF 2005; WHO 2005; WRI 2005, etc.) to gather global figures;
- interviews with NGOs working in the field⁶ to understand both their daily challenges and how they deal with such challenges;
- field visits conducted by our user researchers and designers to observe and/or interview people in their communities and homes, and so gain direct insights into people's life experiences and true stories from specific environments.

More precisely, the information from the NGOs covered questions concerning their work-related problems, as well as their experience of people's living conditions, any infrastructural and technological constraints, solutions currently used and their limitations. Research into individuals was also addressed via face-to-face interviews, observations and focus groups, where possible to leverage the informal regional networks made available by our designers and researchers in the various branches. Knowledge and data collected in the regions were then conveyed to the Philips Design headquarter where they were consolidated into common 'digestible', informative and inspirational formats.

Consolidating informative and inspirational input: 'personas' in local contexts

⁵ Workshop speakers were: Derryck Klarkowsky of Médecins Sans Frontières (MSF), an international humanitarian aid organization that provides emergency medical assistance to populations in danger worldwide; Meredith McWade of Save the Children, an organization that provides opportunities for the world's children to live safely and healthily; Dave Irvine-Halliday of the Light Up The World, a foundation that provides white LED lighting solutions powered by renewable energy to the world's poor in remote rural areas.

⁶ In addition to the three main NGOs previously quoted, UNICEF should also be mentioned as an initial useful source of information.

Qualitative and quantitative information was matched and compiled into ‘personas’⁷: flexible design instruments used to provide insights into ‘a-day-in-the-life’ of the targeted individual or community. In total, 19 ‘personas’ were created to be used as specific design briefs for the creative session. These ‘personas’ were delivered in A3 format newsletters: ‘The Design Times’. Their aim was to summarize relevant statistics on key issues, together with related informative and inspirational knowledge such as case studies on context-specific technological challenges and emerging opportunities, testimonials, individual or collective stories reflecting people’s needs and aspirations, interactions with products and services, and their socio-cultural habits.

In the workshop, ‘personas’ were key tools in thinking of people-focused solutions. They helped participants to experience the main issues faced by their protagonists in certain geographical and socio-cultural conditions, and they stimulated the imagination of designers when it came to forming possible answers to such issues. In total, 33 healthcare/wellness and education related issues were addressed in compelling stories used as design briefs.

5. Ideation: design process and tools

The workshop participants, representing more than 30 different nationalities, were divided into 46 teams comprising designers and researchers with different backgrounds and capabilities. The teams, made up of five members each, received a specific ‘persona’ brief to work on, under the guidance of a facilitator⁸ assigned to steer the discussion and the design activities. The overall process consisted of four main phases. In the ‘opening’ phase, employees got to know each other and familiarized themselves with the key global social and environmental challenges. In the ‘analytical’ phase, they learned about and analyzed the specific issue/s and contexts to be dealt with. In the ‘thinking and creative’ phase, they explored design ideas and they dealt with their conceptualization and visualization. In the ‘promotional’ phase, they were asked to market the value of the concept(s) generated to the Philips Design community.

Guideline design tools and templates were made available, but they respected the necessary freedom of thinking and creativity of the teams at all times. Two tools in particular – the ‘chain reaction’ exercise and the ‘design-for-sustainability’ design orientation criteria – were used to increase the prospects of envisaging environmentally and socially effective product and service ideas.

‘Chain reaction’ exercise

With this tool, the teams were invited not just to solve the problem(s) raised by their assignment, but also to understand them by examining related people’s socio-cultural values and behaviors, as well as the consequences of these. The teams therefore analyzed every issue through a mental framework linking values/behaviors > problem > consequences, to understand how to break this vicious circle and introduce solutions able to stimulate a new, positive chain to improve quality of life. For example, to understand the problem of indoor air pollution in rural India, the teams connected with:

- its causes - the use of wood and inappropriate stoves, the enjoyment of tasting food cooked on wood, the lack of knowledge regarding possible health-related effects, etc.

⁷ ‘Personas’ are defined here as fictional characters that encapsulate global issues in regional contexts. More precisely, they are representations of certain categories of individuals and groups of people dealing with various issues and quality of life concerns in specific geographical and socio-cultural contexts.

⁸ The facilitators were trained beforehand to use a series of supporting design tools and exercises (included in a facilitation notes booklet) specifically developed for this workshop.

- its consequences - respiratory and eye-related diseases, children's healthcare costs, children's time spent in collecting wood, women's time spent cleaning the kitchen, etc.

Then, to overcome the problem, the teams tried to come up with actions that would deliver direct healthcare benefits, together with positive parallel environmental and socio-economic advantages, both at the individual and the community level. For instance, by introducing a smart cooking device, it was hoped that children would have more time to study because they had to spend less time collecting wood, CO₂ emissions and wood consumption would decrease and healthcare awareness in the family would increase, all of which might result in healthcare cost savings and more efficient work activities.

'Design-for-sustainability' orientation criteria

This tool was designed to take into account both environmental and social criteria 'up-stream' in the concept creation phase, and to stimulate a 'system thinking' approach, one that moves beyond technical product changes towards a more holistic concept of innovation. Its aim was to prompt designers with principles and criteria that could support innovative design strategies to influence patterns of production, distribution, marketing and use. Indeed, only by contextualizing technological opportunities, and considering regional and local community requirements is it possible to aim to deliver truly sustainable solutions (Manzini and Jegou 2003, 36-68).

The 'design-for-sustainability' tool made use of five main clusters, and further specific design orientation criteria:

- Design for longevity: aesthetic and functional up-grading; modularity and scalability; durability; recovery in its various forms; etc.
- Design for dematerialization: miniaturization; integration and multi-functionality; virtualization; biodegradability; etc.
- Design for efficient and clean energy: solar / wind power; human power; hydrogen power; hybrid systems; etc.
- Design for cultural diversity: local resources; technologies appropriate to the context of application; traditional smart practices; individual and community empowerment, etc.
- Design for sharing: common use of space, assets, time, knowledge, etc.

A few of these criteria were selected by the designers so that they could set up their own design strategy and specify the potential of their concepts in terms of environmental and social performance.

6. Value co-creation: a 'chulha' for healthy indoor cooking

The intensive burst of focused creativity generated approximately 80 design ideas for products and product-service-systems. Following the workshop, these ideas were filtered by criteria such as their fit with the Philips strategy and social investment policy, their technological feasibility, and their fit with the Millennium Development Goals⁹. The screening, carried out with

⁹ In September 2000, all 191 United Nations Members States pledged to meet eight socio-economic and environmental goals by the year 2015. The goals, stated in the Millennium Declaration, include: 1. Eradicate extreme poverty and hunger; 2. Achieve universal primary education; 3. Promote gender equality and empower women; 4. Reduce child mortality; 5. Improve maternal health; 6. Combat HIV/AIDS, malaria and other diseases; 7. Ensure environmental sustainability; 8. Develop a global partnership for development (UN 2000).

various stakeholders, narrowed the number of potential solutions to 20, re-grouped into seven promising clusters considered to be opportunities for intervention. From the various opportunities available, a couple of design ideas were chosen for implementation. The first one to come to life was a low-tech stove that would tackle the respiratory problems affecting the health of millions of people (especially women and children) in the developing world who still cook indoors using biomass fuels¹⁰. The aim was to design, develop and test an appropriate solution for local cooking habits in rural and semi-urban areas of India. The goal was to provide a wood-burning solution that was:

- easy to access (easy to distribute/install/use/maintain)
- locally produced
- able to reduce indoor pollution
- low cost for replication and scalability.

Within eight months, a three-person design team from Philips Design Pune evolved an initial design idea into a concrete solution tested in the field. In a collaborative effort with local social stakeholders, entrepreneurs, and a few families, they produced two versions of the 'Chulha' stove in an attempt to satisfy people's cooking needs more healthily and, at the same time, stimulate socio-economic activities for local business development (Fig. 1).

Input from various local social stakeholders included a solid contribution from SEDT (Socio Economic Development Trust) NGO for rural development programs and people mobilization in the field, Dhanalaxmi Bachat Gat and Mahalaxmi Bachat Gat, two SHGs (Self-Help Groups) that empower local women to become entrepreneurs.

Particularly instrumental in this humanitarian design project was the cooperation of ARTI¹¹ (Appropriate Rural Technology Institute), an NGO with considerable expertise in the smokeless cooking domain. ARTI helped the team to scan available technologies and benchmark current smokeless and non-smokeless solutions; identify specific challenges and opportunities for design interventions and scalability; and carry out technology development and field tests.

7. Field research in rural and semi-urban areas

The research previously carried out (for the 'Sustainable Design Vision – Design for Sense and Simplicity' workshop) on indoor air pollution in India was sufficient to provide a basic understanding of the issue and its context, and to feed the initial creative process. However, at this stage, additional knowledge was necessary to develop a truly effective solution: knowledge of people's purchasing power; specific culinary habits; cooking behavior and user interaction with available devices; information on local production and distribution channels, etc.

The design team - with the support of Green Earth, a local sustainable development agency dealing with grass root behaviors and social studies – gathered deeper, more specific insights into people by carrying out research in the villages of Kerwadi, Phaltan, Maltan and Karad, all in the state of Maharashtra. The research consisted of an initial 3-day visit and introductory meetings with people from the villages, followed by one week of observations and in-depth

¹⁰ Total world deaths from indoor air pollution due to burning solid fuels are estimated at 1,619,000 each year. India alone accounts for 25% of such deaths. Almost 500,000 of the victims are women and children (WHO 2000).

¹¹ ARTI develops and promotes the diffusion of innovative rural technologies to improve the quality of life and standard of living of India's rural inhabitants. It operates in various areas and acts through its training centre located at Phaltan, 120 km north of Pune.

interviews targeting four rural and two semi-urban families¹². The interviews, conducted in the local language (Marathi), were kept quite informal. All the family members were observed, with particular attention paid to the women who were carrying out cooking activities. The findings were then synthesized and consolidated in 'contexts-of-life cards' describing the women's profile and related cooking activities, the families' way of life, and their environment.

Infrastructural conditions, production facilities and distribution channels for stoves currently in use were investigated using the ARTI network. A needs analysis of stakeholders already active in the business of smokeless and non-smokeless stoves was performed by organizing various focus groups involving local entrepreneurs and self-help groups, in order to understand the major issues they face with regard to current solutions and the replication and scalability of their activities. Focus areas regarding logistical transportation constraints and maintenance were extracted and consolidated in the same format used to summarize the findings from users.

It soon became clear from the results of the research that the key local design requirements called for a cooking solution able to fulfill the following physical and socio-cultural conditions:

- adaptability to different biomass fuels (from wood to cow dung), available in different seasons and locations
- adaptability to people's needs when cooking 'chappati' (bread), steaming rice, boiling water
- adaptability to the use of different, non-standard cooking vessels
- adaptability to various vehicles and distribution channels.

8. Concept development and testing

In both the concept development and the concept prototyping and testing phases, there was a collaborative effort to provide a meaningful response to the product requirements identified. Users' insights, and the findings relating to stakeholders' needs were used in a local workshop involving the various players engaged in the design process (ARTI, SEDT, SHGs, two local entrepreneurs and two users). The workshop, intended to define the key product features desired, involved 16 participants who were invited to share their viewpoints and concerns in informal dialogues. The dialogues were then followed by a session to conceptualize ideal stoves and their expected performance within the contexts under investigation. During this phase, several pages of insights (context-of-life cards) offering a stakeholder's needs analysis - including end-users' needs - were circulated among 'experts' in the production, distribution and use of wood-burning stoves, for their feedback and refinement.

At the end of the workshop, key design features were pinpointed and prioritized as 'easy-to-use and maintain', 'context-specific', 'flexible', 'able-to-radiate-value', and 'accommodating'. These features were visualized into design sketches. In the next step, a fine-tuning process conducted by the design team proposed the following major design innovations:

- modularity to facilitate distribution, installation and reparability of both the stove and the chimney

¹² The rural families had an average of four adults and three children, with a monthly income of between 73 and 184 Euros. The semi-urban families on the other hand had an average of two/four adults and two children, with a monthly income of between 92 and 184 Euros.

- mechanisms to ensure the chimney could be cleaned safely (currently, where chimneys are available, they are monolithic blocks which can be cleaned only from the roof)
- improvement to construction (the weak bridge in current stoves is a common problem)
- flexibility of use for roasting and steaming, additional functional features and appealing design format.

These innovations were incorporated in two versions of our 'Chulha': 'Sampoorna' and 'Sara'. In collaboration with ARTI, both versions have been translated into real applications. The 'Sara' is a double oven with a hotbox which costs between 9 to 10 Euros. The 'Sampoorna' offers a more sophisticated solution, including a steamer, at a cost of around 14 Euros. The stoves and their chimneys are mainly made of concrete modular components, covered with clay. Their modularity facilitates the replacement of broken parts over time as well as transportation (Fig. 2). The stoves can be packed in recycled woven polypropylene bags, which are by-products of waste from agricultural storage, etc. The moulds are made of FRP - fiber reinforced plastic - at a cost of 183 Euros, with the capacity to turn out more than 3,000 pieces.

Prototyping at the ARTI training centre in Phaltan, and testing in rural and semi-urban homes, involved SHG representatives and stove users. Feedback regarding improvements suggested a few modifications to the initial versions of the stove. Design interventions included technical changes related to the manufacturing process to optimize gas flow within the stoves and improve their thermal efficiency, an easier way of assembling components such as self-locking pieces for do-it-yourself assembly, the introduction of a soot collector, and a solution for fixing chimneys to the wall. Modified versions were then installed in 12 homes for further trial and to evaluate their technical performance.

9. Achievements and obstacles

The value co-creation process undertaken during this journey of understanding and learning has resulted in a stove that makes indoor cooking healthier when compared with traditional indoor open cooking fires - a stove that also claims to be simple to use, easy to maintain, produced and distributed locally, relatively cheap, and suitable for different culinary habits. It also helped to go one step further. According to Dr. P. Karve of ARTI, the overall research and design contribution has helped in proposing a "*Chulha that has a better chance of succeeding than other concrete smokeless stoves because it is more attractive, and has improved functional features*" (Karve 2007). It has helped to shape a stove that is easy to handle, from manufacturing to installation and maintenance. "*The 'Chulha' and its chimney are easy to transport thanks to their modular design. They are quick to assemble and broken parts can be easily replaced over time*" (Karve 2007).

The route to reaching these results was not without obstacles, however. Initially, we faced a communication barrier that slowed down interaction with the key stakeholders and end-users, and therefore the entire design and development process. We had to learn to speak a 'language' able to:

- create convergence of different (political, social and economic) interests;
- give 'voice' to 'vulnerable' end-users, bringing their viewpoints into the dialogue with multiple stakeholders with precise, and often consolidated, opinions.

Such a 'language' could be developed only through a long and patient process of 'intensive listening' and engagement. An effort that, in the end, paid off.

Indeed, it should be noted that, among the various cooking solutions already available for low-income people, the 'Sampoorna' and 'Saral' seem to be competitive: their original objectives - adaptation to local culinary habits, use of available resources and infrastructural conditions; value chain optimization; economic affordability¹³; reduction of indoor air pollution – have been reached through careful improvements. With regard to environmental aspects in particular, it has been estimated that, in theory, the 'Sampoorna' and 'Saral' stoves could reduce indoor air pollution from smoke by up to 90% in comparison with indoor open cooking fires. What's more, technical evaluations conducted by ARTI shows that exhaust gases and carbon monoxide emissions were reduced in comparison with other concrete-based indoor smokeless stoves. Specifically, a deeper evaluation of our stoves' technical performance, made by the College of Engineering in Pune, reveals:

- better heat distribution, fuel and thermal efficiency (time and fuel required for boiling 1 liter of water is 11.5 min. and 255 gm for Saral and 14 min. and 315 gm for Sampoorna, in comparison with 22 min. and 415 gm required by traditional stoves)
- higher retention of soot (100 mg for Saral and 80 mg for Sampoorna, in comparison to 20 mg for traditional stoves).

However, no official quality standards of reference are currently available to judge the technical performance of concrete stoves. Various NGOs use different criteria to evaluate performance and different values for acceptable emissions. As a consequence, it becomes difficult to scientifically prove the added value of the 'Sampoorna' and the 'Saral'. At the moment, our intention is to go beyond evaluating the technical performance of our stoves, to fully assess their economic and social performance over the long-term, in order to verify all the benefits they claim to deliver. Current plans include an impact study that will run from October 2008 to July 2009 to monitor a few cases where final versions of the stoves are in use (Fig. 3).

10. Replication and scalability

So far, to facilitate replication and diffusion of the 'Sampoorna' and 'Saral' stoves, design innovations have been recorded in sketches and technical drawings. A comprehensive package of communication and training materials, including posters and videos, has also been created to explain how to produce, distribute, install and maintain the stoves. With the support of local NGOs, the intention is to allow Self-Help Groups and citizens to use this knowledge for free. The hope is that this will create not only better living conditions for the end-users - women and children - but also stimulate local entrepreneurial activities centered on the production and distribution of safe and healthy stoves.

ARTI will continue to play an essential role in all of this. It has included our solutions in its portfolio of stoves ('gas-fired', double wood-burning stove, simple concrete stove) for rural and semi-urban communities, and it trains local stakeholders to produce and distribute the most appropriate solution for the selected target audience, according to income level and infrastructural conditions. The current production and distribution model proposed for the 'Sampoorna' and 'Saral' stoves can easily be adapted as a decentralized model, in which a trained entrepreneur invests in a mould that is able to cover the demand of a couple of villages, with 50-60 households each. However, the aim is to shift to a semi-decentralized model where localization takes place at district level: with this model of scalability, the new entrepreneur will be able to serve up to 30-40 villages, with 200-250 households each.

Besides the activities carried out by Arti, another NGO, already approached us with the intention of stimulating the broad diffusion of the 'Sampoorna' and 'Saral' stoves in the rural areas

¹³ Cooking solutions currently available in rural areas cost 2-3 Euros for an open non-smokeless stove made by local craftsmen, and 8 –12 Euros for basic indoor smokeless solutions made by NGOs and local entrepreneurs.

of Karnataka state (Southern India). Knowledge transfer from our side is currently running and scaling up activities from the NGO¹⁴ will start in July-August 2008. Our ambition is to answer requests from NGOs spread throughout India, but also in countries such as Pakistan, Bangladesh, etc., where these stoves can provide appropriate solutions to very similar people's needs and culinary habits.

11. Conclusions

How have design and creativity contributed to sustainable development in this overall humanitarian experience? What are the major lessons learned? Although it is difficult to provide a complete evaluation of an experiment still in progress, when we look back at our original workshop and at the project in India, it is possible to outline certain considerations about the approach used and the results achieved to date.

From the very start of the experience, adopting a process in which designers and researchers operate in a multidisciplinary team, in open dialogue with NGOs bringing knowledge from the field, was essential in ensuring that people's real needs and true aspirations (life stories and user insights) were integrated into the initial creative 'thinking'. This was done not only to raise the level of understanding about sustainable development challenges and quality of life issues, but also to set up ideation sessions related to specific locations and infrastructures, ways of living and socio-cultural habits, to help our work force to envision effective human-centered solutions.

By using design skills and competencies to face crucial social / environmental problems affecting the most fragile categories of our society, employees felt motivated and empowered to make a difference through their own work. The 'momentum' created with this event has resulted in a practical and effective way of pushing forward our organization's social commitment. Since that time, a few employees have started to make use of their free time and training time to do some more work on ideas that came out of the creative workshop. The management has established the 'Philanthropy by Design Initiative' in order to continue the collaboration with some of the NGOs¹⁵ involved at the beginning of this experience.

Along the journey, design capabilities have demonstrated their full range of potential when it comes to contributing to the creation of sustainable value: from the power of creativity in generating a common vision outlining directions for specific humanitarian opportunities, to the importance of design skills in articulating this vision, and even to translating this vision into concrete humanitarian answers. By utilizing a tangible design application, we were able to bring our Philips brand to life and, consequently, establish conditions for a return on brand equity: either by putting an appropriate solution to the problem in place directly, or by enabling local players to replicate and diffuse such a solution autonomously. We have, as a matter of fact, used our design knowledge to go beyond traditional tasks of technical product design. Our designers, often used to working in different domains and across various businesses, have demonstrated that it is possible to assume a steering role in organizing a proper network of competencies, connecting multiple players with complementary expertise, and facilitating a value co-creation process right up to its implementation.

All this has resulted in what M. Porter defines, in one of his articles, as capacity building, organizational learning and input for long term business strategy (Porter and Kramer 2006, 1-15). More specifically, we believe it has generated innovative ways of working that can stimulate

¹⁴ The NGO is setting up a plan with the ambition to reach 250,000 families in five years time.

¹⁵ Beside the 'Chulha' project, we are currently working on a concept to support Médecins Sans Frontières in their task of diagnosing infectious diseases in remote areas, and in training local healthcare workers. It is a solution able to better capture microscope images of the malaria parasite and facilitate quality control of diagnosis in front line health stations and medical camps. The solution can also be used to support educational activities for malaria parasite identification.

social innovation on the one hand, while supporting business innovation on the other. Indeed, this humanitarian project offered us the opportunity to discover new insights when it comes to resolving societal problems within non-familiar realities, triggering the identification of innovation spaces for business growth.

Operating in contexts of developing and emerging economies, we have certainly learned some basic ground rules that should be considered in future projects, especially when addressing 'underserved' people.

First of all, we have realized that an understanding of the local physical infrastructural, economic and socio-cultural conditions is imperative before making any technological choices. The challenge in coming up with an accessible, affordable and sustainable solution for local needs is to evaluate the best technological solution at a given moment in time, rather than opt for the best available technology (which is typical of a technology push approach). With our 'Chulha' for instance, insights from the targeted users and local stakeholders helped us to understand current barriers to cultural acceptance, as well as constraints on replication and scalability. It is on the basis of these insights that we were able to decide on the most feasible and appropriate technological answer to achieve our objectives.

Another thing we learnt is that the design phase should be treated as a continuous and iterative process, which goes backwards and forwards in relation to the feedback received when the solution is tested in the field. Any change and adjustment made to the initial proposition needs to be evaluated in the field, not only in terms of technical performance, but also in terms of possibly wider-reaching effects. For instance, feedback from evaluation of the 'Chulha' gave us information to inspire improvements beyond product and usage performance, to include instructions for easy and cost-effective installation, distribution and production - aspects that have stimulated new design interventions which could result in the optimization of the entire value network.

Last but not least, it should be noted that the co-design approach resulted not only in a way of delivering a solution that better fit the context of application, but also enhanced the potential benefits of the stakeholders involved, democratizing the value creation process, and therefore increasing the chance of implementing valuable solutions for all. Indeed, with this approach, users and stakeholders worked together in a participatory process where they all put their own interests on the table. Key, in this regard, was to go beyond the 'intensive listening' principle described by S. Hart in 'Strategic Initiatives at the Base of the Pyramid. A Protocol for Mutual Value Creation' paper (Simanis, Hart, Enk et al. 2005), to include a 'true engagement', where users were even empowered in the decision making process.

The question facing us now is this: how do we capitalize on what we have learned? Our hope is that we can continue make use of our imagination. It is our belief that imagination, creativity and 'holistic thinking' from design communities - if they are underpinned by solid research to help understand people and their socio-cultural and natural environments - can become important assets to break down boundaries and help move sustainable development forward. After all, at the end of the day, sustainability is, and remains, a collective creative process of change.

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Fig. 1: Overview of the research, analysis and development steps carried out in India. A joint effort for value creation based on user and stakeholder insights (Philips Design 2007).

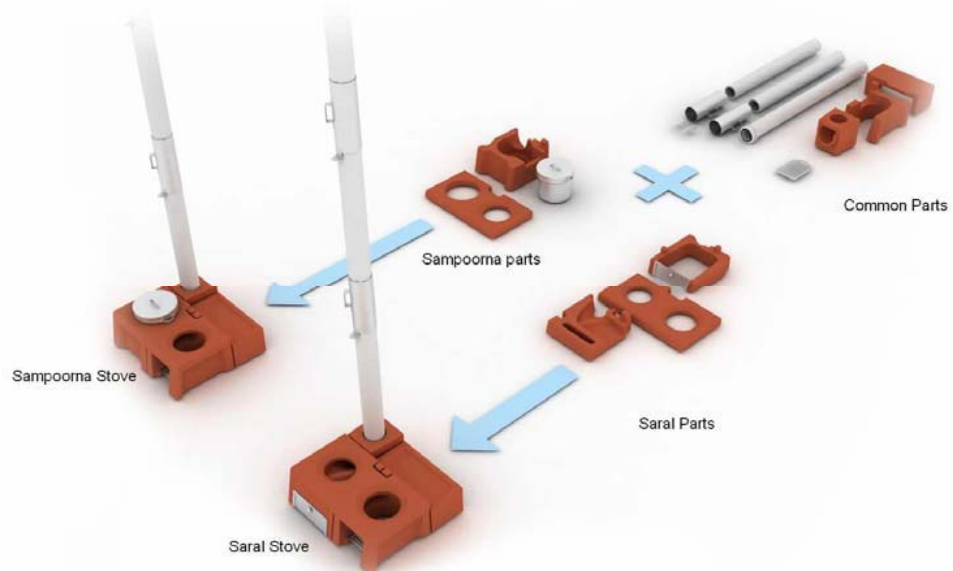


Fig. 2: Visualization of the 'SaraI' (basic) and 'Sampoorna' (complete) wood-burning stoves, and their modular components. Both stoves and their chimney are made of concrete components covered with clay.



Fig. 3: Users of the 'Saral' stove in the rural village of Shivri, Maharashtra State, India.