

# AGENTS OF TECHNOLOGY, AGENTS OF CHANGE

IN INDONESIA

IMPACT ASSESSMENT REPORT
MAY 2012



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Indonesia's rural population faces significant challenges in accessing cooking fuels. The use of open fires and inefficient cookstoves degrades the environment as well as causes detrimental health effects for households. Poor households face substantial time and cost burdens from purchasing or collecting wood to use with traditional cooking methods. Additionally, the Indonesian government's progressive reduction in kerosene subsidies makes it more challenging to afford kerosene. Access to clean drinking water is also a challenge for rural and poor communities. Rural development challenges combined with Indonesian gender norms result in a lack of sufficient income generating opportunities for women.

Kopernik works to address critical development challenges through the distribution of low-cost, life-changing technologies to rural communities. In September 2011, Kopernik introduced the UB.03-1 Biomass Cookstove and Nazava Water Filter to selected communities on the island of Lombok, Indonesia. Kopernik disseminates the technologies through Pekka, its local partner organization. Through this partnership, women become "Technology Agents" by selling the biomass cookstoves and water filters on a consignment basis. This program is intended to not only introduce the technologies to poor communities, but also to provide an income generating opportunity for poor women without the burden of taking on debt or risk. As of April 2012, 280 biomass cookstoves and 30 water filters were sold.

Kopernik is a returning SIPA workshop client. Over a period of six months (November 2011 – April 2012), a six-member student team from the School of International and Public Affairs (SIPA) at Columbia University conducted a process evaluation of the technology distribution model and impact assessments of the UB.03-1 Biomass Cookstoves and Nazava Water Filters. This report details the activities and methodology of the SIPA team and presents the subsequent findings and recommendations. This report is focused on the process evaluation and impact assessment of the UB.03-1 Biomass Cookstoves. Due to limited opportunities of data collection, findings on the Nazava Water Filters can be found in a supplemental report.

The SIPA team traveled to Lombok in January and March of 2012 and conducted focus groups and one-on-one interviews with Technology Agents, end-users of the technologies and other community members. This fieldwork helped assess the context in which these technologies are distributed, in addition to the impact of the technologies on the target community.

Initial findings from the January Fieldwork informed the design of the March survey tool and subsequently, the analysis of the resulting data. Some initial findings included:

- Households own and use multiple cook stoves and cookstove types
- Type of cookstove usage varies by rainy and dry season
- Cookstove usage varies due to occupation

Key impact findings from the March surveys included:

- End-users use less firewood for the biomass cookstove compared to the brick stove
- Biomass cookstove end-users spend less time collecting firewood than non-users
- There was no difference in time spent cooking between biomass cookstove endusers and non-users
- There was minimal difference in monthly fuel expenditures between end-users and non-users
- 63% cite chopping wood is a main challenge to use the biomass cookstove

The usability and durability were cited as major challenges of the biomass cookstove by endusers. The SIPA team's main recommendation was to re-assess the functionality of the biomass cookstove and consider other options or redesign the cookstove to better meet local needs.

The SIPA team presented initial findings at the end of each field visit to Kopernik staff to inform them of the progress of the evaluation. The team presented final findings and initial recommendations to the Kopernik co-founders, Toshi Nakamura and Ewa Wojkowska, in April 2012 at Columbia University. In response to the findings and recommendations, Kopernik suspended the distribution of the biomass cookstove and is in the process of providing replacements or repairs for end-users who have reported problems with their cookstoves.

Since April 2012, Kopernik has been in discussions with the biomass cookstove inventor to improve the quality of the cookstove in order to better meet local needs of Lombok. The organization is also working to further track end-users who have had problems with their biomass cookstoves in order to perform the necessary replacements or repairs. In addition, Kopernik is considering a strategy of targeting the poorest segments of Pekka's membership to become Technology Agents as well as subsidizing transportation costs in order to increase the amount of commission for Technology Agents.

We hope this report will serve as an insightful tool for Kopernik to build more effective programs that are both financially sustainable and conducive to local ownership.



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# **CLIENT**

Kopernik is a 501(c)3 nonprofit organization that provides innovative, life-changing technologies designed for the developing world. Through its online marketplace, Kopernik strives to bridge technology developers, local communities in developing countries that seek affordable and locally appropriate technologies as well as individuals and corporations worldwide that support its programs by providing capital. As of April 2012, Kopernik has funded 46 technology projects in 11 countries in Asia and Africa. Through its programs, Kopernik reached over 74,000 people and disseminated over 14,100 technologies since 2010. More information about Kopernik and its model can be found in Annex A.

# AGENTS OF TECHNOLOGY, AGENTS OF CHANGE PROJECT

# PARTNERSHIP WITH PEKKA

Kopernik leverages strong community networks by partnering with local organizations in order to promote widespread technology dissemination and adoption. Kopernik partnered with Pekka, a local Indonesian NGO, to introduce low-cost technologies in selected communities in Lombok. Pekka works within an existing network of women's groups with a focus on single female heads of households.

The Agents of Technology, Agents of Change project uses a micro-consignment model that enables Pekka member participants to become Technology Agents



and sell these products in their communities. Kopernik also provides the Technology Agents with training on product features, set-up, maintenance and bookkeeping. More information about Pekka can be found in Annex B.

This program is intended to not only introduce useful technologies to poor communities through Pekka's existing social network which works on a trust-based system, but also to provide an incomegenerating opportunity to the Technology Agents without their taking on debt or risk. Kopernik hopes that these Technology Agents, many of whom are divorced, widowed or caring for a disabled or seriously ill spouse, will also find new confidence and respect in their communities as a result of participating in the program.

# MICROCONSIGNMENT MODEL

The concept of the micro-consignment model was initially developed by Ashoka Fellow Greg Van Kirk, in order to create opportunities for members of rural communities to receive the education, training and products necessary to sell essential goods to underserved areas. This model's strength lies in reducing potential risk for micro-entrepreneurs by eliminating the need for start-up capital and avoiding financial failure as the goods are consigned. With consignment, a supplier gives a product to a retailer, who then sells it. After the sale is completed, the retailer reimburses the seller while keeping a commission. The risk is, therefore, taken not by the retailer, but by the supplier. The micro-consignment model serves as a sustainable way to provide necessary products to developing countries and as a source of additional income for micro-entrepreneurs. Additionally, the micro-consignment model lends itself well to a gender inclusive project, as many micro-entrepreneurs are women and rely on their existing social network to sell the products. The additional income generated can increase their financial stability as well as provide for their children's education. The Agents of Change consignment model works in a similar fashion. However, it uses Pekka as an intermediary supplier, linking the seller with the product. The breakdown of the profit and commissions earned by the Technology Agents are detailed in the table below:

# AGENTS OF TECHNOLOGY, AGENTS OF CHANGE MODEL: PROFIT BREAKDOWN

Cost for Pekka to buy from Kopernik: 114,500 Rp

Cash payment (1 time payment in full) for end user: 135,000 Rp

**Profit**: 20,500 Rp (15% Profit)

Profit Breakdown				
COMPONENT	PERCENT OF TOTAL PROFIT	AMOUNT		
Technology Agent Commission	25%	5,125 Rp		
Transportation	30%	6 <b>,</b> 150 Rp		
Koperasi	25%	5,125 Rp		
Province Level	13%	2,665 Rp		
Kabupaten Level	7%	1,435 Rp		
TOTAL	100%	20,500 Rp		

<sup>\*</sup>Pekka decided on commission prices.

# KOPERNIK'S TECHNOLOGY SOLUTIONS FOR LOMBOK

# UB.03-1 BIOMASS COOKSTOVE AND NAZAVA WATER FILTER

Kopernik introduced various products at a technology fair in 2011, where various technology providers presented their innovations to Pekka members so that they could decide which technologies were most appropriate and useful to distribute. In the end, Pekka members chose the UB.03-1 Biomass Cookstove and Nazava Water Filter.

The cookstove uses solid biomass such as woodchips, wood shavings, or wood sticks cut to a certain size as well as corn-cobs, as fuel. Its intention is to save women both time and money by using this cookstove for cooking, as they would no longer need to gather as much or purchase wood and/or kerosene. The UB.03-1 Biomass Cookstove has additional health and environmental benefits. According to Kopernik, the cookstove can save up to 80% of fuel compared to traditional three-brick or stone stoves. Additionally, the cookstove produces little to no smoke during operation when the fuel is properly dried.<sup>2</sup>

The water filter is composed of two 13.5 food grade plastic water containers joined by a ceramic water filter candle in the middle. The filter candle contains an activated carbon that absorbs chemicals and odors. One filter candle can produce 7,000 liters of sterile water, which is equivalent to approximately three years of drinking water for an average household.<sup>3</sup> This technology saves time and fuel associated with boiling water as well as raises awareness about clean drinking water.

<sup>\*\*</sup> As of March 2012

# INDONESIA CONTEXT

# **COUNTRY CONTEXT**

Located in the heart of Southeast Asia, Indonesia is an archipelago of 17,000 islands extending 5,150 kilometers (3,200 miles). The largest islands are Sumatra, Java, Kalimantan (Indonesian Borneo), Sulawesi and the Indonesian Papua.<sup>4</sup> According to 2010 population census data, Indonesia has 237,641,326 people with roughly 50% of its population living in rural areas.<sup>5</sup> Indonesia is the largest economy in Southeast Asia and has an increasingly affluent middle class of 45 million people.<sup>6</sup> The Indonesian population is highly diverse with over 200 major linguistic and cultural groups. Indonesia is secular as it is home to Muslims, Protestants, Roman Catholics, Hindus, and other unspecified religions.<sup>7</sup>



Today, Indonesia is considered Southeast Asia's largest and most stable democracy with a 'vibrant free press and active civil society'. Indonesia fared well during the 2008-2009 global recession. It had an average annual GDP growth rate of 5.27% from 2000 to 2011 and an expected growth rate of 6.4% in 2012. Indonesia has a well-balanced economy with a balance of all major sectors. The main drivers of the Indonesian economy are petroleum and natural gas, which are found mostly along the Coast of Sumatra and Kalimantan. Other major industries include textiles, apparel, mining, forestry, chemical fertilizers, rubber, agriculture and tourism. As of 2010, Indonesia is considered to be a lower middle-income country with an average gross national income per capita of \$2,500 USD. In Specific Specific

# **L**ОМВОК

The island of Lombok is located in the Nusa Tenggara Barat (NTB) province. It is similar in size to its western neighbor, Bali. According to the 2010 population census, Lombok has a population of 3,166,789 people, 47% of which is involved in agriculture. Lombok is well known for its fertile soils and agricultural



practices, but the island also suffers from frequent bouts of drought and famine. Subsistence farming combined with inefficient water management techniques leaves the rural population economically vulnerable. Other common industries of Lombok are mining and drilling followed by social services and local private businesses.<sup>11</sup>

In 1997, the Asian crisis resulted in the slump in the Indonesian Rupiah (Rp). This consequently led to a sharp increase in the prices of everyday household goods, including basic food. Though there was an increase in food prices, this did not relate to a proportional increase in wages and incomes. The crisis had a severe impact on the poor. In the post-crisis period, unemployment was estimated to have risen to 16.7% in Lombok. This economic crisis gave rise to the emigration of the locals to neighboring regions within Indonesia and neighboring countries with better job prospects given limited economic opportunities on Lombok. For example, during this period, scores of local men from Lombok migrated to Malaysia in search of employment as low-skilled workers.

The poor employment rates in Lombok can be also attributed to low levels of educational attainment as well as the compounded effect of a rapid increase in the local population.<sup>15</sup> This leaves many men under high pressure to fulfill their traditional roles are primary income generators.

# **TRADITIONS AND GENDER NORMS**

Despite the recent wave of orthodox Islam in Lombok, the Sasak culture continues to prevail particularly in social relationships and daily customs. Gender norms in the communities are also closely tied to ongoing religious, political and economic changes. These norms are also greatly influenced by the traditional norms from each ethnic group's adat. In Indonesia, conservative gender ideology only considers men as the primary heads of household. Women are traditionally tied to the domestic sphere. <sup>16</sup>

As a result of traditional gender roles and norms, illiteracy rates amongst women are the highest in Lombok. The perception of a women's role in society coupled with the patrilineal *adat* and the patriarchal Islamic inheritance law leave women with little financial security. <sup>17, 18</sup> Despite recent government's efforts to pursue gender-neutral inheritance in the country, local and religious customs often favor men to receive a greater share of assets and inheritance. <sup>19</sup>

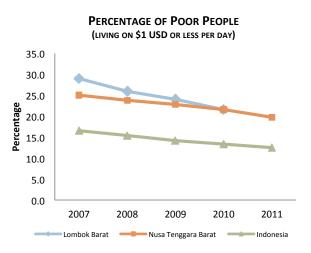
There is an increase in the number of female-headed households in Lombok. Many married women work in an effort to provide a steady source of income for their families after their husbands leave in search of economic opportunities elsewhere in Indonesia and abroad. However, as local women take up employment, they are still expected to maintain existing roles in religious matters and in the home. These economic and social realities along with the unequal local customs of asset ownership and gender roles place women in a vulnerable situation. In the growing number of female-headed households in Lombok, achieving financial stability is especially difficult due to the combination of various cultural, religious and economic disadvantages.

# **DEVELOPMENT CHALLENGE: POVERTY**

In 2011, the Government of Indonesia set the national poverty line at 233,740 Rp per capita per month, which equates to less than \$1 USD per day. The measurement of poverty takes into account varying prices in rural and urban areas and establishes different poverty lines for each region.

For example, in 2011 the poverty line in NTB was 194,518 Rp in the rural areas and 244,960 Rp in the urban areas.

Since 2007, there has been a steady increase in the poverty line every year coupled with a steady decrease in the number of poor people on a national level, as shown in the graph on the right.<sup>20</sup>



Source: Badan Pusat Statistik Republik Indonesia (Statistics Indonesia) 2012

However, more may need to be done to meet poverty reduction targets given the economic growth of Southeast Asia's largest economy. This is especially true when the unofficial 100 million Indonesians that live on \$2 USD or less per day are taken into account. According to the World Bank, Indonesia's poverty rate fell from 16.7% in 2004 to 14.2% in 2009, but did not meet the government's target of 8.2%. <sup>21</sup>

#### **DEVELOPMENT CHALLENGE: FUEL SUBSIDY**

The Government of Indonesia considers access to energy as a priority policy issue. The government has traditionally subsidized of cost of kerosene, which kept prices well below the market price. In 2005, the government ended subsidies for industrial consumers, but not for small to medium enterprises. However, individual households are heavily dependent on kerosene for household cooking and lighting, and subsequently, the subsidy remains a large fiscal burden on the government. In 2008, the government budget for kerosene subsidies totaled \$2.8 billion USD.<sup>22</sup> The government intends to gradually end the kerosene subsidies nationwide. As a consequence, the reduction in kerosene subsidy poses an incredible burden on the rural poor. As shown in the chart below, while most rural households depend on wood as the main fuel for cooking, nearly a third of rural households in West Lombok still depend on kerosene.

#### PRIMARY COOKING FUEL SOURCE BY PERCENTAGE OF RURAL HOUSEHOLDS

	Main Fuel for Cooking							
	Electricity	LPG	Kerosene	Charcoal	Wood	Others	None	Total
Lombok Barat	0.13%	0.62%	31.52%	0.03%	67.41%	0.06%	0.24%	100%
Nusa Tenggara Barat Province (NTB)	0.23%	0.52%	21.64%	0.05%	77.36%	0.07%	0.15%	100%
Indonesia	0.50%	24.28%	8.40%	0.81%	65.68%	0.09%	0.24%	100%

Source: 2010 Population Census Data - Badan Pusat Statistik Republik Indonesia (Statistics Indonesia)

Reports suggest that subsidized-fuel increase will increase the number of poor people due to the expected increase of overall prices. As a result, President Susilo Bambang Yudhoyono introduced conditional cash transfer programs targeted at the poor to offset the reduced fuel subsidies. The Indonesia government is considering several compensation programs as means to alleviate the impact of increased fuel prices on the poor.<sup>23</sup>

# **ALTERNATIVE SOLUTIONS**

The Government of Indonesia is currently implementing a kerosene-to-LPG stove conversion program for individual households. A primary target of the program includes housewives who currently use kerosene and whose families have an income of less than 1.5 million Rp per month.

The government began distributing LPG stoves in Java, South Sumatra and Bali in 2007. In 2010, the program was extended into Sulawesi, Kalimantan, other parts of Sumatra, and West Nusa Tenggara Barat. Since the beginning of 2011, the program has been implemented in 17 provinces with over 50 million households converted. Several factors hinder the successful transition from kerosene to LPG stoves. Many people, especially the elderly, hesitate to use an LPG stove due to the fear of explosions. This can be attributed to instances of fires in densely-populated areas of Jakarta due of explosions caused by improper cookstove usage and gas leaks during the early stages of the program.

#### THE INDONESIAN GOVERNMENT KEROSENE-TO-LPG CONVERSION PROGRAM

"Facing fiscal pressure from high kerosene subsidies, the Government of Indonesia started a kerosene-to-LPG conversion program to reduce the kerosene subsidy in 2007. The program provides a free start-up package consisting of a 3 kg LPG tank, a compact LPG stove and its accessories (regulator and hose).



Originally, the plan was to roll the program out to 42 million households and small enterprises by 2012 in an effort to replace more than 6 million kiloliters of kerosene annually. The target has since been increased to 48 million start-up packages.

In addition to the free start-up package, the government also subsidizes the price of LPG for the 3 kg cylinder tank. In 2007, Ministry of Energy and Mineral Resources (MEMR) estimated that the production cost of one kilogram of LPG is 6,700 Rp. The subsidized price (before tax) for a 3 kg cylinder tank is 3,500 Rp/kg, meaning each kilogram of LPG is subsidized by 3,200 Rp.

Currently, the selling price after tax is 4,500 Rp/kg, so 3 kg LPG costs about 13,500 Rp/tank."





Source: A Citizen's Guide to Energy Subsidies in Indonesia, The International Institute for Sustainable Development (2011)

As previously shown in the Primary Cooking Fuel table, there are significant differences in the composition of cooking fuels used by the rural and urban populations. However, traditional biomass fuels (such as wood) are still the main source of cooking fuel for rural populations because modern and transitional fuels are often not accessible in rural areas due to cost and availability.<sup>25</sup>

The pervasive use of traditional cooking techniques by the use of biomass energy in inefficient or open air cookstoves have damaging health effects, especially on women who cook and children who are exposed to indoor cooking smoke. Women and children are at risk of inhaling soot and small particles emitted from burning traditional biomass fuels in inefficient cookstoves. The risks posed by these inefficient cookstoves are up to twenty times higher than the maximum levels considered safe by the World Health Organization (WHO).<sup>26</sup> WHO and the United Nations Development Program (UNDP) estimate that smoke from cooking fuels accounts for nearly two million premature deaths annually worldwide, which is more than the deaths from malaria and tuberculosis combined.<sup>27</sup>

There are also significant burdens on the environment as well as on women and children, who are primarily responsible for collecting biomass fuel. A typical family can use as high as two tons of biomass cooking fuel per year. <sup>28</sup> This work is time-consuming and involves walking long distances carrying heavy loads as well as weathering conditions that pose safety risks. It also causes the gradual degradation of the local environment, which gradually results in increased fuel collecting time and effort. <sup>29</sup>

# **FOCUS ON CLEAN COOKSTOVES**

A World Bank report on universal access to clean energy recommends that rural areas in the East Asia and the Pacific region to focus on "marketing and promoting new efficient solid fuel stoves and biogas systems" because it does not foresee a drastic increase in access to modern cooking fuels (such as LPG and electricity) by rural areas in the near future.<sup>30</sup> Depending on the reach of Indonesia's LPG conversion program, the switch to modern cooking fuels may be a possibility. However, the report highlights the constraints of manufacturers that are unable to produce efficient cookstoves at a large enough scale for them to be affordable by rural consumers who have limited purchasing power.<sup>31</sup>

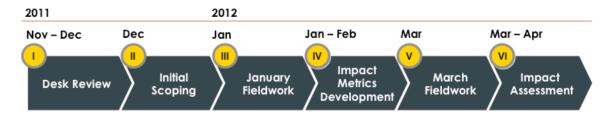
The Global Alliance for Clean Cookstoves (GACC) is part of a worldwide push for the distribution and promotion of clean cookstoves because inefficient cookstoves contribute to climate change through emissions of greenhouse gases such as carbon dioxide and methane, and aerosols such as black carbon. There is research on the potential health and environmental benefits of clean cookstoves that support further investment in clean cookstove design, testing, and monitoring.



# PHASED APPROACH

The SIPA team took a phased approach to the project, which involved both qualitative and quantitative research.

The six phases central to our research methodology are outlined below:



# PHASE I - DESK REVIEW

TIME FRAME: NOVEMBER - DECEMBER 2011

**Objective**: Gain basic understandings of the contextual background of the project.

# **Core Analytical Activities:**

The team's background research created a foundation on which to build our assessment.

- Conduct a literature search to acquire background knowledge related to the overall socioeconomic landscape of Indonesia, and more specifically of area in which the project is currently running, the island of Lombok.
- Research energy and water options that are currently available in the area, including access to electricity, energy sources such as firewood, charcoal, kerosene and other types of fuels, bottled or natural clean water.
- Understand the two specific technologies of the Agents of Technology, Agents of Change project: the UB.03-1 Biomass Cookstove and the Nazava Water Filter.
- Conduct landscape research on the effectiveness and impact of ceramic water filters and fuelefficient cookstoves in general, using case studies and existing research papers. This allowed the
  team to gain an understanding of the micro-consignment model as well lessons learned and
  best practices from around the world that could possibly be applied to similar models.

# PHASE II - INITIAL SCOPING

# TIME FRAME: DECEMBER 2011

**Objective**: Define the preliminary scope of the project based on the initial research questions.

# **Core Analytical Activities:**

- Conduct a stakeholder analysis (Refer to Annex E).
- Identify research questions from the Preliminary Terms of Reference (PTOR). The three research questions are below:
  - 1. Is the technology being distributed efficiently along the value chain and how does this affect the ability to replicate the model and/or increase the scale of the project?
  - 2. How does the technology, both the UB.03-1 Biomass Cookstove and the Nazava Water Filter, impact Technology Agents who sell and distribute the technology), particularly with regards to income, confidence, and daily schedule?
  - 3. How does the technology, both the UB.03-1 Biomass Cookstove and Nazava Water Filter, impact end-users, particularly with regards to time and money?
- Develop sub-set questions to guide the January Fieldwork (Refer to Annex F).
- Develop focus group and semi-structured interview guides for January Fieldwork (refer to Sample Focus Group and Interview guides in supplemental file).

# PHASE III - JANUARY FIELDWORK

# TIME FRAME: 4-17 JANUARY 2012

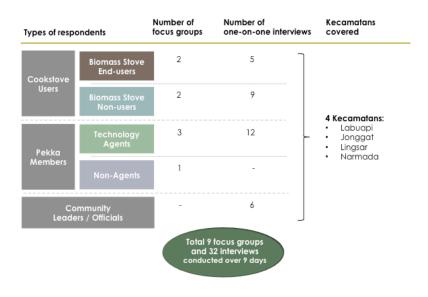
# Objectives:

- Assess the applicability of initial research questions and refine as needed.
- Understand roles of Kopernik and Pekka and their on-the-ground operations.
- Capture community cooking practices and preferences as well perceptions in relation to the project.
- Identify the details of the whole value chain of the two technologies and key actors involved in each process.
- Test the relevance of preliminary impact assessment indicators.

# Core analytical activities:

- Conduct focus groups and individual interviews with Pekka members, Technology Agents, and biomass cookstove end-users to learn about their experience and awareness of the technologies and their initial impact.
- Conduct focus groups and individual interviews with non-Pekka members and non-technology users to gauge their awareness and access potential barriers to the distribution model.
- Interview village chiefs and other government officials in order to obtain a more contextual understanding of the individual communities and the role in which Pekka plays in these areas.
- Present initial findings to Kopernik management in Ubud, Bali.

A breakdown of focus groups and interviews are below:



# PHASE IV - IMPACT METRICS DEVELOPMENT

# TIME FRAME: JANUARY - FEBRUARY 2012

**Objective**: Design impact assessment tools based on the results of the preliminary analyses and findings from the January Fieldwork.

# **Core Analytical Activities:**

- Analyze data and refine scope of assessment after completion of the January Fieldwork. The initial findings from the January field trip revealed that the distribution of the Nazava Water Filter was extremely limited. Due to the limited number of water filter end-users that were available to be interviewed, the team narrowed down the scope of the project to focus its efforts to assess impact of the biomass cookstove project. (see supplemental report for findings on Nazava Water Filter).
- Develop a new evaluation framework for the UB.03-1 Biomass Cookstove program with twooverarching themes: Impact Assessment and Process Evaluation.

Each theme consists of a few research questions as elaborated in the below:

IMPACT ASSESSMENT	Impact on end-users
	Impact on Technology Agents
PROCESS EVALUATION	Feasibility of the existing Agents of Technology, Agents of Change model
	Scalability of the existing model
	Replicability of the existing model

The tables below detail the specific sub-questions that stemmed from the main research questions. These sub-questions framed the surveys used during the March Fieldwork. Three separate questionnaires were created to capture demographic data as well as cooking behavior and preferences from Technology Agents, end-users and non-users.

# **IMPACT ASSESSMENT METRICS**

	Indicators
1. Impact on End-Users	<ul> <li>Amount of firewood used for cookstoves</li> <li>Time spent on collecting wood</li> <li>Time spent on cooking</li> <li>Monthly fuel expenditures</li> </ul>
2. Impact on Technology Agents	<ul> <li>Acquisition of new skills and knowledge</li> <li>Change in household incomes</li> <li>Usage of commissions received</li> <li>Changes to daily schedules</li> </ul>

# PROCESS EVALUATION METRICS

	Key Questions				
1. Feasibility of the existing Agents of Technology, Agents of Change project model	<ul> <li>Does the technology provider achieve quality, stability and cost-competitiveness of supply?</li> <li>Is the technology low-cost, life-changing and meeting the local needs?</li> <li>Is Kopernik leveraging all of Pekka's strengths as a local partner?</li> <li>Are Technology Agents communicating the value of the technology to promote the distribution?</li> <li>Are there mechanisms to support continued usage of the technology and collect feedback?</li> </ul>				
2. Scalability of the existing model	Can the Agents of Technology, Agents of Change model be expanded further in West Nusa Tenggara Barat by selling more cookstoves?				
3. Replicability of the existing model	Can the Agents of Technology, Agents of Change model be applied to Kopernik's new projects in different geographic locations and with different local partners?				

# PHASE V - MARCH FIELDWORK

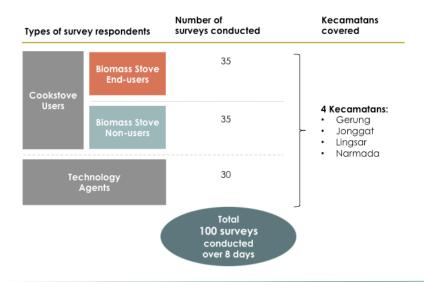
# TIME FRAME: 1 - 14 MARCH 2012

# Objectives:

- Collect data and information that is necessary for our impact assessment and process evaluation study.
- Update Kopernik's management team on initial findings of our project.

# **Core Analytical Activities:**

- Conduct one-on-one surveys with Technology Agents, end-users, and non-users of the UB.03-1 Biomass Cookstove to collect quantitative and qualitative data on demographics, cooking behavior, fuel expenditure, and impact of technology in four *kecamatans* in Lombok over eight consecutive days on the ground.
- Presented a preliminary analysis of the data as well as qualitative findings on the two technologies to Kopernik management in Ubud, Bali.
- A breakdown of the number of surveys conducted are below:



# PHASE VI - IMPACT ASSESSMENT

# TIME FRAME: MARCH - APRIL 2012

# **Core Analytical Activities:**

- Analyze data on impact of the biomass cookstove on end-users and Technology Agents
  - Specific details such as 'Change in Time Spent on Cooking' between end-users and nonusers and 'Monthly Fuel Expenditures' were calculated to ascertain overall impact
- Create report to reflect findings and analysis as well as recommendations for Kopernik
- Produce a data pack depicting all the quantitative analysis, including graphs, tables and charts in PowerPoint format to hand over all survey data
- Present findings to Kopernik management, and another for SIPA faculty and students



The SIPA team conducted a two-pronged assessment on the initial impact of the technologies on endusers as well as the impact of selling the technologies on the Technology Agents. Together with Kopernik, the team identified key indicators to measure such impact. The Agents of Technology, Agents of Change project is still in an early implementation phase following its launch in September 2011. During the time of the assessment, the UB.03-1 Biomass Cookstoves had more units sold than Nazava Water Filters. The team was able to capture a much more inclusive picture of impact of the biomass cookstoves and will therefore, focus their assessment on this particular technology. The summary of findings on the water filters can be seen in the Water Filter Final Report supplement.

# **IMPACT INDICATORS**

To measure the impact of the biomass cookstove on end-users, the following indicators were used: the amount of firewood used for cookstoves, time spent on collecting wood, time spent on cooking, and monthly fuel expenditures. Due to the lack of baseline data, it was not possible to capture actual changes of the aforementioned indicators of cookstove end-users before and after the adoption of the biomass cookstoves. However, data obtained from non-users of the cookstove provided a contextual comparison in terms of cookstove usage behavior and patterns. In order to examine how the project has affected the Technology Agents, the team assessed impact based on four indicators: acquisition of new skills and knowledge, change in Technology Agents' household incomes, usage of commissions received, and changes to their daily schedules.

This report presents the initial impact of the technology during the early phase of the Agents of Technology, Agents of Change project. The findings also capture the challenges of the technology and the distribution process as of March 2012. However, this may not be reflective of longer-term impact, and a subsequent evaluation is required at a later stage of the project in order to capture mid-course corrections undertaken by Kopernik and draw long-term conclusions.

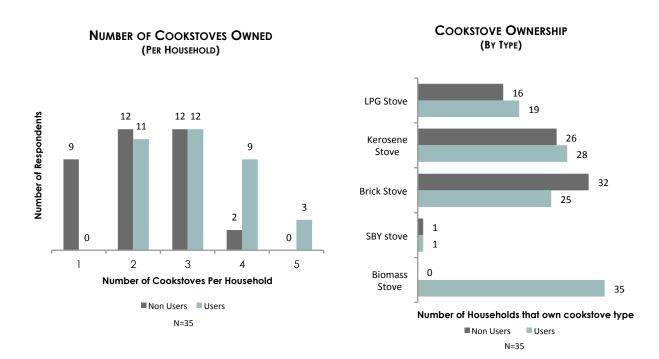
# IMPACT ON END-USERS

# RESPONDENT DEMOGRAPHICS AND METHODOLOGY LIMITATIONS

It is important to note that there are limitations to the team's methodology and to the resulting impact analysis. The team conducted household surveys with 35 biomass cookstove end-users, 35 non-users, and 30 Technology Agents.

First, the team examined biomass cookstove end-users and non-users using household demographic data and cooking behavior data to assess comparability. The two groups are not perfectly identical populations and subsequently, there may be additional factors other than the biomass cookstove ownership that drive the differences observed in the data. For instance, both end-users and non-users tend to own and use multiple types of cookstoves for various purposes as shown in the chart below. The team observed multiple cases where the biomass cookstove was not used as a primary cookstove by end-users.

Therefore, data comparisons between biomass cookstove end-users and non-users cannot be directly translated into the impact of solely owning a biomass cookstove. Additionally, cookstove usage varies seasonally and it was challenging for most survey respondents to clearly distinguish their cookstove usage and experiences for each season. Lastly, cookstove usage varies due to occupation. Those that use cookstoves for snack-making businesses may spend more time cooking and require more fuels on a daily basis, and could potentially skew the results.



# **AMOUNT OF FIREWOOD USED FOR COOKSTOVES**

Through one-on-one interviews and focus groups conducted in January, several women mentioned that they required less wood while cooking on the biomass cookstove. One end-user explained, "using the biomass cookstove, I use less wood and I cook everything on it. I can put all the wood in at one time and leave it alone." In March, the team surveyed 30 end-users that had used both the traditional brick stove and the biomass cookstove. All of these women perceived that they used less firewood when cooking with the biomass cookstove, which confirmed the fuel-efficiency of the stove.

# **INDICATOR 2**

# TIME SPENT ON COLLECTING FIREWOOD

Gender norms in Lombok delegate particular household chores to women. Women are primarily responsible for collecting firewood and cooking. Collecting firewood is time consuming and often physically straining as women carry bundles of wood on their head for long distances. The assessment aims to investigate the change in time spent on collecting firewood from utilizing different types of cookstoves.

On average, non-user households spend 7.2 hours per person per month collecting firewood. When comparing this to the biomass cookstove end-user households, there was a noticeable difference. On average, the biomass cookstove end-user households spend 5.8 hours per person per month collecting firewood. This is 1.4 hours less than the non-user households of the biomass cookstove. This finding is aligned with the end-user's perception that the biomass cookstove utilizes less wood than the brick stove to cook the same amount of food.

Per Person

7.2 Hours

5.8 Hours

Non Users

N=31

N=23

It is important to emphasize that this was calculated per person per household to account for

larger households. Therefore, the actual time saved for the primary gatherer of fuel (usually women) is far greater than 1.4 hours per month. This reduction of time spent collecting wood may liberate time in a women's schedule for her to do other activities such as spend time with her kids, or devote time to other income generating activities.

While biomass cookstove end-users enjoy a significant reduction in time spent collecting wood, there was one challenge associated with using the biomass cookstove. Several end-users explained that chopping wood to use with the stove has become burdensome and time consuming. The design of the current cookstove requires the wood be chopped into smaller pieces so that it can be loaded into the top.

In Lombok, chopping firewood is typically a male's responsibility. It can be difficult for women to chop wood every time they need to cook for their families. In particular, the burden may be higher on single heads of households. The team found that 26% of the surveyed end-users were widowed or divorced. These women mentioned that they are burdened with the physical exertion of chopping wood. Of those end-users surveyed, 6% spend 7 hours per week chopping firewood and 19% spend at least 3.5 hours per week. Despite these challenges, it is clear that the biomass cookstove achieves its purpose to reduce time collecting firewood.

# TIME SPENT ON COOKING

On average, end-users of the biomass cookstove spend more time on cooking when compared to non-users. The data suggests that end-users spend roughly 11 minutes more time on cooking per day.

Average time spent on cooking was also calculated as per person in a household to account for larger households (where longer time may be spent cooking meals due to more members in the household, not necessarily because the stove they use takes longer to cook).

It is important to note that this difference could be attributed to other factors that include the occupations of the end-users, or whether or not the biomass cookstove is their primary cookstove for cooking. Therefore, this indicator may not accurately capture the specific time spent on cooking for end-users and non-users. In fact, some end-users reported the biomass cookstove is more time-efficient than the brick stove.



# Per Day; Per Household 118 Minutes 107 Minutes Non-users N=35 N=34

One user relayed that this was a common perception of the biomass cookstove when she decided to buy it. "We bought the biomass cookstove because they told us it would use less wood, and because it was mobile, and we could use it anywhere and also because it cooks faster." This is especially true when comparing the time spent cooking with the biomass cookstove to that of the brick stove, since the data includes cooking time from all cookstoves, including LPG and kerosene. This supports Kopernik's intention to reduce cooking time for brick stove users.

# **MONTHLY FUEL EXPENDITURES**

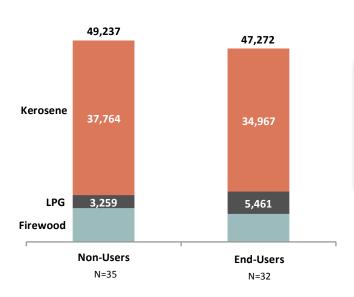
In addition to time-savings, another determinant of the impact of the biomass cookstoves is savings associated with fuel costs. As discussed, it is very common for households to utilize more than one cookstove type; therefore they have multiple fuel expenses each month. Average monthly expenditures were calculated per person to capture the discrepancies that may be caused due to differences in fuel consumption based on varying sizes of a household.

For the biomass cookstove end-users, the team found that the average monthly expenditure on firewood is 6,844 Rp per person while they spend 34,967 Rp on kerosene and 5,461 Rp on LPG gas. On average, the total monthly fuel expenditure is 47,272 Rp per person. The expenditure on firewood varies significantly when examining the figures of non-users where the average monthly expenditure on firewood is 8,214 Rp per person, which is approximately 20% more than that of the end-users.

The figures for the aggregated fuel expenditures also show that on average, non-users are spending 1,965 Rp more than biomass cookstove end-users on fuel per month per person. The number of families that actually purchase firewood limited the data for firewood expenditures because most families collect firewood rather than purchase it.

#### **AVERAGE MONTHLY EXPENDITURES ON FUELS PER PERSON**

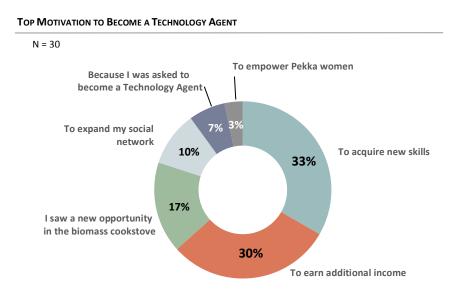
Indonesian Rupiah (IDR)





# IMPACT ON TECHNOLOGY AGENTS

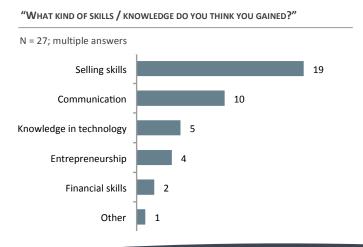
The team asked 30 Technology Agents their initial motivation for becoming a Technology Agent. The two most common reasons cited were to acquire new skills and to earn additional income.



Kopernik initially envisioned that this project would provide supplemental income to female-headed households. The Technology Agents' motivation for participating in the project shows alignment with Kopernik's project goals. In assessing the project's impact on the Technology Agents, the team attempted to determine if the Technology Agents' motivations translated into actual benefits, as well as to investigate if there was any perceived opportunity cost of being a Technology Agent.

# INDICATOR 5 ACQUISITION OF NEW SKILLS AND KNOWLEDGE

When asked whether they gained new skills by becoming a Technology Agent, 90% of respondents cited that they had indeed gained new skills. When Technology Agents were asked what kinds of skills they



were actually gaining, 70% of the respondents said 'selling skills' and 37% said 'communication skills'. For this specific question, Technology Agents could select more than one option – implying that several of the Agents felt that they gained more than one type of skill set. Some Technology Agents relayed that they can leverage their new skills for their future work, either as a Technology Agent, or in other entrepreneurial activities. The nature of the work for a Technology Agent requires the individual to be proactive and go door-to-door to sell.

In turn, they develop a unique skill set as an Agent as opposed to those who sit and sell in the market. One woman said, "the training was useful, particularly the financial and socialization training because I had no previous knowledge." Another woman explained, "selling the cookstoves has made me more confident. I feel proud now that people want the cookstove." These quotes are impressive anecdotes of how socializations and training have made a positive impact in the lives of these women.

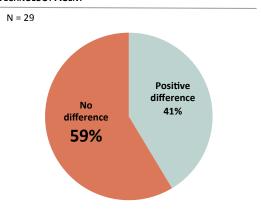
# **INDICATOR 6**

# **CHANGE IN HOUSEHOLD INCOMES**

Technology Agents' second most common expectation was to gain additional income. Approximately 41% of the respondents perceived a positive difference in their personal incomes after they started selling the biomass cookstoves. It is the team's belief that the remaining 59% of the Technology Agents, have yet to perceive the intended effect on their incomes. Indeed, the survey found that 58% of the Technology Agents have yet to take any commissions at all.

The respondents that have never taken their commission explained that they wanted to wait until they had saved a large lump sum of money. Several Technology Agents mentioned during a focus group in January that, "we think it is too small a commission to take out – so we will wait until it is a larger amount".

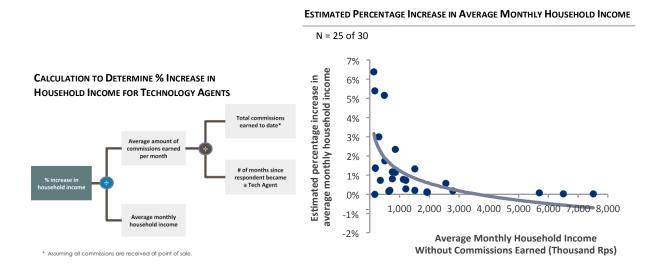
DIFFERENCE IN PERSONAL INCOME AFTER BECOMING A TECHNOLOGY AGENT



There were also inconsistencies in the ways the Technology Agents took their commissions, which may have led to a discrepancy in the findings. For example, the March team encountered four respondents that explained there were rules in place that did not allow women to take their commission until they had met a certain sales quota.

One woman told us her story: "When I attended the initial training, I was only informed of how much I could earn per unit sold. I never imagined that we would need to wait until we meet the group sales quota. We are going to discuss as an entire group and decide how to use the commissions once we reach the sales quota – I don't know when that will be." This system and other perceptions of low commissions are limiting the economic benefits of being a Technology Agent.

The team also calculated the estimated percentage increase on Technology Agent's monthly household incomes, assuming all commissions were received at point of sales. The formula we used is as illustrated in the exhibit below.



The resulting data from this calculation supports the conclusion that the economic impact on Technology Agents has been limited so far. The team found that selling cookstoves had about a 0.5 % increase on average monthly household income. However, selling cookstoves has more of a positive impact on the households with relatively low monthly incomes. The graph above shows that even small commissions make a bigger impact. Taking these findings into consideration, the program can maximize economic impact and deliver higher results by focusing on poorer households.

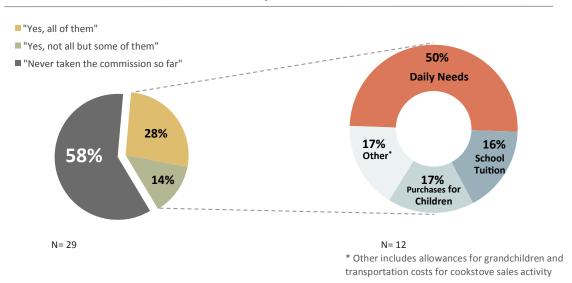
# A TECHNOLOGY AGENT SEES MULTIPLE BENEFITS

One Technology Agent is estimated to have a more than 6% increase in her average monthly income of about 135,000 Rp. She explained, "since my husband left me in Lombok to work in Malaysia 10 years ago, my life has become difficult. In time, he not only stopped sending a remittance to me, but also was never heard from again. I heard that he made his own family there in Malaysia. I do not know if I am still married to him or divorced from him already, or even widowed... But in any case, I have to sustain my life all alone. By becoming a Technology Agent, I am now able to earn additional income. I feel less lonely today as people in this village recognize me and talk to me. I am so grateful that I was given this great opportunity."

# **USAGE OF COMMISSIONS RECEIVED**

Of the 29 respondents, 42% had collected all or some of their commissions. Of those respondents, 83% stated that they used their commissions for household needs or children's school fees and supplies. The graph below presents the breakdown of how comissions were used by Technology Agents.

#### HAVE TECHNOLOGY AGENTS TAKEN THEIR COMMISSIONS? IF SO, HOW DO THEY SPEND IT?



#### **INDICATOR 8**

# **CHANGES TO DAILY SCHEDULES**

In an attempt to identify any potential opportunity cost of being a Technology Agent, the survey asked a series of questions regarding women's day-to-day schedules, in particular if Technology Agents had more or less time for different activities such as daily chores, other income generating activities, or just free time. Out of the 30 respondents, 90% saw no difference in their time for household chores, 87% saw no difference in the amount of time they have for other income generating activities, and 83% saw no difference in their free time.

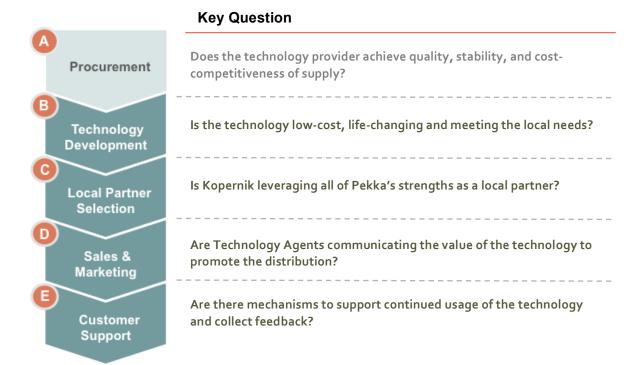
This demonstrates the limited opportunity cost of selling the cookstoves. The 17% who have less free time are actually selling cookstoves in their downtime, while generating income, thus not sacrificing their productive time. One Technology Agent explained, "I sell cookstoves only when I have downtime so it does not affect my other businesses." Other women echoed this statement: "the Technology Agent's work is my only income generating activity and it allows me to make most of my free time to make money". This qualitative data also shows that most Technology Agents sell the biomass cookstove for supplemental income rather than as a primary source of revenue. Thus, selling the stoves is not significantly cutting into the time and daily schedule of the Technology Agents.



# FEASIBILITY OF AGENTS OF TECHNOLOGY, AGENTS OF CHANGE MODEL

In assessing the effectiveness of the "Agents of Technology, Agents of Change" model, the team analyzed the value chain composed of the 5 stages as illustrated below. In this section, we address each of these 5 stages to identify strengths and gaps in the existing process.

# BIOMASS COOKSTOVE VALUE CHAIN IN LOMBOK



# A. PROCUREMENT

The procurement process is out of the scope of the SIPA project; thus, it will not be addressed in this report.

# **B. TECHNOLOGY DEVELOPMENT**

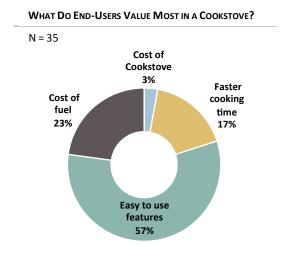
This technology has the ability to be life-changing, but the team found some issues that needed to be addressed before it could achieve its full potential.

# **TECHNOLOGY SELECTION PROCESS**

Kopernik held a technology fair in Lombok showcasing various different low-cost technologies that could meet the needs of the local population. After the technology fair hosted by Kopernik, several Pekka coordinators of each *kecamatan* were interviewed about the technologies they thought would be most appropriate for the Technology Agents to sell in West Nusa Tenggara Barat. The technologies they

chose, the UB.03-1 Biomass Cookstove and the Nazava Water Filter, were then adopted for local usage with an assumption that they were technologies needed in the areas that the Technology Agents operated in, and there would be sufficient demand for them. This participatory approach serves as a useful tool for gathering local input, and can be further strengthened by conducting a preliminary needs assessment during the initial pilot phase of the project. This would allow Kopernik to get a better sense of potential customers outside of the Pekka network and of their interest in the technologies.

As a result, the team found a difference between what the local population needs and the



technology provider's perception of their needs. A survey of 35 end-users found the most important factor when purchasing a new cookstove is the cookstove's easy-to-use features. On the other hand, according to the technology provider, the local population would respond most positively to "a reduction in the cost of fuel" and a "faster cooking time".

#### **GEOGRAPHICAL ADAPTABILITY**

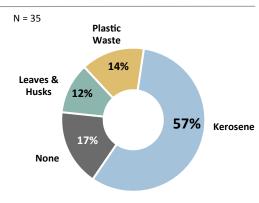
Several factors explained in the Background explain why the biomass cookstove is needed in both the local and global context. However, the tropical climate of Lombok is not conducive to the use of this cookstove as it is currently designed to require completely dry firewood. The cookstove works particularly well during the dry season, but poses a particular challenge during the 6-month rainy season. In addition, continuous exposure to ocean air – an inevitability on a small island like Lombok- accelerates the corrosion of the biomass cookstove.

As a result, end-users often see rusting and corrosion on their cookstoves. Several end-users reported that their cookstoves broke after 4-6 months of usage. This is well before the 1-year lifespan that was promoted by the cookstove inventor. One Technology Agent thought the biomass cookstove lasted for approximately 6 months, whereas another mentioned telling her customers it lasted for two years.

Limited access to dry wood in the rainy season often results in a continued reliance on kerosene. One of the goals of the technology was to reduce the usage of kerosene. The team found that it does reduce the use of kerosene as a primary fuel for cooking.

However, some kerosene is still being used as a starter fuel, due to the lack of dry wood that is necessary for the biomass cookstove's optimal performance. The chart on the right shows the various secondary fuels used to 'start' the fire for the biomass cookstove. Endusers also mentioned that they occasionally used plastic waste as well as leaves and husks to ignite the fire.

# FUELS USED TO 'START' THE BIOMASS COOKSTOVE

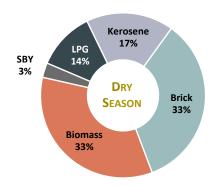


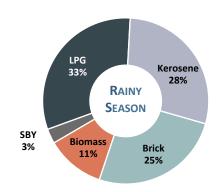
\* Primary Fuel: Firewood

The charts below show the usage of the biomass cookstove depending on the season. The seasonal patterns demonstrate the difficulty of using the biomass cookstove in the rainy season. This data may not accurately represent the use of the cookstove, because the team's two visits to the field were during the rainy season. In addition, most end-users received their stoves in November, just before the start of the rainy season. Therefore, they may not have had much opportunity to use the stove during the dry season.

#### PRIMARY COOKSTOVE BY SEASON (END-USERS)







# PRODUCT FEATURES

The team heard from several end-users who found the biomass cookstove's mobility to be a positive feature. Some remarked that the design of the cookstove reminded them of the kerosene stove, which has the perception of being reliable.

End-users and Technology Agents saw an opportunity for improvement in a particular feature that make the product difficult to use. The UB.03-1 Biomass Cookstove is top-loading, so chopping the wood into pieces small enough to fit can be time-consuming. This feature got overall mixed reviews. Some women noted that they frequently left their cookstove and did other chores around the house. But others mentioned the exact opposite: that they needed to stay right next to the cookstove because they were worried about the embers coming out from the top.

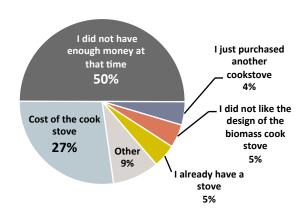
#### **PRICING**

Many end-users, Technology Agents and non-users stated that they felt the price of the cookstove was relatively high compared to other options despite the biomass cookstove being priced in the middle range of all the cookstove options available in Lombok.

Approximately 77% of non-users listed financial reasons as the primary reasons for not purchasing the biomass cookstove. The breakdown of two reasons is as follows: 50% said they did not have enough money at the time, while 27% said the cost of the biomass cookstove was prohibitive.

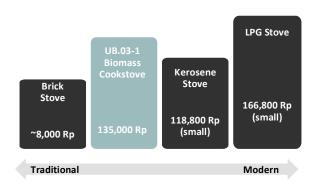
# WHY NON-USERS DECIDED NOT TO PURCHASE THE BIOMASS COOKSTOVE

 $N = 22^*$ 



# \* Those who were approached by a Pekka member

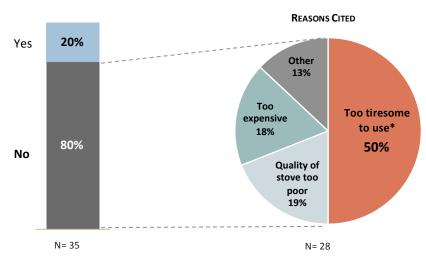
#### PRICE OF COOKSTOVES IN LOMBOK



<sup>\*</sup> LPG and Kerosene stoves: prices found in the mall/modern market

As a consequence, potential for wide-spread adoption of the technology appears to be limited so far. When asked, 69% of end-users stated they would not buy the biomass cookstove again. Of the survey respondents that mentioned that they would not purchase another biomass cookstove, 50% cited that it was because the cookstove is too "tiresome to use" and 19% mentioned that quality of the cookstove is poor.

#### WOULD YOU PURCHASE AN ADDITIONAL BIOMASS COOKSTOVE?; IF NOT, WHY?



<sup>\*</sup> Mostly refers to the arduous task of chopping wood

#### C. LOCAL PARTNER SELECTION

# LEVERAGING STRENGTHS OF LOCAL PARTNER

Our findings demonstrate that the distribution method leverages the strength of the Pekka network, as was originally intended by Kopernik. In its various efforts to empower women in Indonesia, Pekka supports about 6,500 rural widows in over 300 villages, 38 sub-districts and across 8 provinces. This demonstrates the vast potential of working with an established partner.

In Lombok, Pekka also has strong administrative capacity as well as organizational structure. A large part of the model depends on this inherent trust and social capital that Pekka has built in Lombok. In fact, 59% of the end-users we interviewed were Pekka members themselves, and 74% of total end-users interviewed had not tried the biomass cookstove before purchasing it.

In addition, the Pekka network provides large opportunities to expand the market for selling technologies. Pekka has a lot of access to the Lombok market through their existing *koperasi* network. Technology Agents are able to use this network to distribute the cookstove. Indeed, 47% of Technology Agents said they used regular *koperasi* meetings as their primary method to sell the biomass coostoves. Currently, there are 20 Technology Agents. As of January 2012, there are 89 existing *koperasi* groups that meet at least once a month, the potential market for biomass cookstove distribution is quite large. Furthermore, taking into account the 2,339 Pekka members in NTB the opportunities for technology distribution is exponential.

# **RECRUITMENT OF TECHNOLOGY AGENTS**

Based on our observations, Technology Agents were hand-selected by Pekka coordinators to attend the technology provider's training in the Fall of 2011. One respondent noted: "I became an Agent because the Pekka coordinator asked me to. I was also asked my several women in my community, so I agreed". Handpicking sales agents adds value in that individual instinct is taken into account when identifying potential sellers and demonstrates the strength of the network.

This strength can be further maximized by instituting a standardized process of recruitment and selection. This would allow Pekka to include more women from its network, who are not necessarily visible to the coordinators, but would like to take advantage of the economic opportunities of becoming a Technology Agent.

The current demographic breakdown of Technology Agents shows that Kopernik's goal of targeting widowed and divorced women has only been partially met. The survey data revealed that 67% of the surveyed Technology Agents were widowed, divorced or single. However, the coordinators showed no particular proclivity towards approaching these women to be Technology Agents. This high percentage could be due to the overall breakdown of Pekka's membership in the area.

PEKKA Membership in Lombok, Indonesia (as of January 2012)

Kecamatan	Female Headed Household	Non-Female Headed Household
Lingsar	449	328
Narmada	116	0
Labuapi	42	0
Gerung	341	493
Kuripan	85	0
Jonggat	308	177
TOTAL	1,341	998

Source: Pekka Headquarters, Lingsar

# **PARTNERSHIP CHALLENGES**

The team identified a potential conflict within the existing Pekka framework, stemming from Pekka's pre-existing savings and loan cooperatives, which serve as the core of the organization's activities, and provides immense potential for the expansion and distribution of the cookstove. The Agents of Technology, Agents of Change program has been combined with the *koperasi* program, although it is meant to be separate. Women from the *koperasis* are chosen to be sales agents, and then the *koperasi* holds on to their commissions until they choose to withdraw it.

Although an isolated case, the team encountered an example in which the lack of distinction between the *koperasi* and the Agents of Technology, Agents of Change project could be problematic. The SIPA team visited a *kecamatan* where the field coordinator coerced Pekka members into buying the biomass cookstove if they wanted a loan of more than 1,000,000 Rp. The field coordinator also pressured the Technology Agents into selling more biomass cookstoves by linking the sale of cookstoves to the welfare of the *koperasi*, even though the two should be unrelated.

#### D. SALES AND MARKETING

# UNDERSTANDING AND COMMUNICATING THE BENEFITS OF THE TECHNOLOGY

One of the successes of the program is that most Technology Agents understand and can communicate the benefits of the technology. When asked, 73% of the Technology Agents cited cost-saving for fuel and less firewood usage as the top selling points of the biomass cookstove. However, these benefits of the biomass cookstove do not align with what customers truly want in a cookstove in general, as already seen in the Technology Development stage of the process evaluation.

In addition, it appears that the environmental benefits of the biomass cookstoves are not effectively communicated by the Technology Agents. This gap was identified in the Technology Agent training process. While 83% of respondents attended the formal training organized by the technology providers, many still harbor misconceptions about the technologies.

According to one woman, "the UB.03-1 Biomass Cookstove is from overseas. Some of my customers think it is cool to



use such foreign technology and that might have enticed them to buy this cookstove".

On the other hand, some Technology Agents not only understand the benefits of the technology, but also have developed strategies on how to better communicate such benefits to their customers. The top-selling Technology Agent who has successfully sold 70 biomass cookstoves explained that she went around in the mornings when she knew women would be boiling water for tea or to begin cooking. She would then demonstrate how much faster the biomass cookstove boils water.

# **INSTALLMENT PLANS**

The team found some discrepancies between the offered installment plans and the actual number of cookstoves bought using the plan. When surveyed, 90% of the Technology Agents said that they offered the installment plans to their customers. However, they also qualified their responses by saying that they do not prefer selling the biomass cookstoves on installment. One Technology Agent stated: "I don't offer installment plans in the community because I don't trust the people, and because I would ultimately be responsible for it."

Another woman, who is both a Technology Agent and a Pekka coordinator, said: "A lot of women want installment plans but I don't like tracking them down for payments because it takes too much time." It appears that the Technology Agents are not strongly promoting the installment plans, as 44% of the end-users paid in installment plans based on the survey responses from Technology Agents.

However, it also appears that some potential customers are unwilling to buy the biomass cookstove on installment even when presented with the option. In the survey conducted with non-users of the technology, 11 of the 17 respondents that cited monetary reasons for not purchasing the biomass cookstove said they would not purchase it even if the installment plan were offered. They cited that they did not have steady income to repay the loan for the cookstove on a regular basis.

# E. CUSTOMER SUPPORT

The Pekka network advantage is that the buyer often knows the seller and can easily contact the Technology Agent if there is any concern over the product. However, there is a lack of standardization in the stove-selling process for customer support. A feedback mechanism to report issues with the biomass cookstove has yet to be developed. The issues of broken and corroded cookstoves were only discovered through the fieldwork of the SIPA team.

Furthermore, while additional parts for the biomass cookstove are available if needed, very few customers had asked for replacements. The end-users usually make minor fixes themselves: one woman said her husband had replaced the corroded cookstove pegs himself, and another had placed a grate on top of the stove to make the flame bigger. One end-user said that her entire biomass cookstove had corroded, so she had stopped using it. The team found that there is an opportunity to better coordinate the replacement of broken parts.

AN EXAMPLE OF BROKEN PEGS AND CORROSION ON A BIOMASS COOKSTOVE



# MOVING FORWARD

#### SCALABILITY

The scalability of the project is the potential expansion for the project in an existing project site. In this context, scalability refers to the ability of the Agents of Technology, Agents of Change model to be expanded further in West Nusa Tenggara Barat, by selling more biomass cookstoves.

A crucial aspect for the scalability of the project is the creation of standard operating procedures that would make it seamless to scale-up the project. The SIPA team found that the impact of the project depended greatly on the *kecamatan* and on the field coordinator.

For example, a standardized transportation process would help increase scalability. Technology Agents are facing logistical difficulties for the transport and distribution of the project. The current model allocates 30% of the profit from the cookstove towards a transportation fund that the Technology Agents can use for their logistical purposes. However, this amount is more than the actual commission the Technology Agents make. Additionally, not many of the Technology Agents know how to use the fund, and end up selling the biomass cookstoves on foot, or spending money out of their own pockets to transport the technology from door-to-door. One Technology Agent said: "I carry three cookstoves on my head, and I go to sell while I walk around and buy cotton for my other job. I sell the cookstove at the same time as a side job".

#### REPLICABILITY

The team hopes that Kopernik is able to replicate this model to implement new projects in different geographic locations and with different partners by learning from past lessons. Replicability will be an increasingly important factor for Kopernik as it partners with different organizations on the ground to distribute low-cost technologies.

Relevant research and project evaluations from this initial stage will be critical to inform Kopernik's work in the future. Furthermore, the lessons learned from a project should be adequately documented to be used in the design of other projects. Reflective practices such continuous monitoring and beneficiary feedback should be built into every project. Lessons learned from evaluation reports should contribute to the formation of future projects and programs. Kopernik's current and envisioned changes to this project will help promote the dissemination and adoption of low cost, life-changing technologies for the developing world.

# PROJECT UPDATES FROM KOPERNIK

In response to the SIPA team's findings and data analysis, Kopernik has already begun to implement changes to address pressing issues and mitigate potential risks to the long-term sustainability of the project. The list below includes the immediate actions taken:

- 1. Kopernik suspended distribution of the UB.03-1 Biomass Cookstove in Lombok.
- 2. Following the data analysis and a presentation to Kopernik management, Kopernik sent a consultant to Lombok to conduct an investigation and repair broken cookstoves. Before the consultant's arrival, the Pekka field coordinator identified buyers who have reported damage (any type, ranging from rust to severe damage) with their stoves. The consultant visited those who were identified, and called more Technology Agents to identify more users while there.
- 3. In April, two Kopernik project officers met with 20 Technology Agents to address the following topics:
  - Valid from now until December 2012, Kopernik instated the following warranty policy:
    - Severely broken stoves, including both the cylinder and table top, can be replaced with a new cookstove if the damaged cookstove is brought to the Pekka center.
    - In the case that only the cylinder or table top is broken, Kopernik will provide a spare part at no cost, as long as the user brings in the old cookstove to show as evidence
    - Technology Agents were asked to relay this information to current biomass cookstove owners.
  - Kopernik will reimburse transportation cost for socialization incurred by Technology Agents. The 30% profit allocation for transport (6,150 Rp) will be transferred to individual commissions (This is more than double the original commission amount).
    - Since all stove sales have stopped, this policy will apply only for Nazava Water Filters at the moment until a better cookstove is identified and ready to be distributed by the Technology Agents.
  - Upon hearing about conflicting koperasi rules, a Kopernik project officer discussed the
    issue with the Pekka field coordinator. Following this discussion, the field coordinator
    met with koperasi coordinators and stressed the importance of separating koperasi
    activity from the Agents of Technology, Agents of Change project.
- 4. Kopernik and Pekka have recruited a new Pekka staff in Lombok to work solely on the Kopernik project and will continue to inform members about the warranty and conduct exchanges.

# RECOMMENDATIONS AND NEXT STEPS

These strategies present recommendations based on what the SIPA team initially observed during its field work. Since then, Kopernik has begun to make changes based on the analysis. These changes are highlighted in the project update section.



STRATEGIES FOR GROWTH

GATHER COMPREHENSIVE INPUT FROM ALL STAKEHOLDERS REGARDING LOCAL TECHNOLOGY NEEDS



ENSURE THAT FEATURES OF THE TECHNOLOGY ARE SUITABLE FOR THE LOMBOK CONTEXT AND CLIMATE.



PILOT THE UPDATED/NEW BIOMASS
COOKSTOVE FOR AT LEAST 3 MONTHS
WITH 36 TOTAL USERS ACROSS 3
KECAMATANS DURING EACH SEASON

FEASIBILITY AND IMPACT ASSESSM	ENT
RECOMMENDATIONS	

Clarify the value proposition of the biomass cookstove in Lombok:

- Assess whether this product serves as a competitor to other cookstoves in the local market or as a transitional technology that appeals to customers who are waiting for their LPG conversion
- Account for prices of other available cookstoves in the local market in order to determine the most appropriate price level for the biomass cookstove

Design a biomass cookstove that meets local needs in Lombok with respect to durability, price and features

### OR

Make necessary changes to the existing biomass cookstove that reflect customer insights

### OR

Research existing options that are designed and produced locally and meeting local needs successfully, such as the SBY cookstove

\*Kopernik responded to the team's initial findings and suspended the sale of the UB.03-1 Biomass Cookstove. They are currently exploring other cookstove options that better suit the usage behavior of Lombok

Ensure that the technology meets the local needs

#### OR

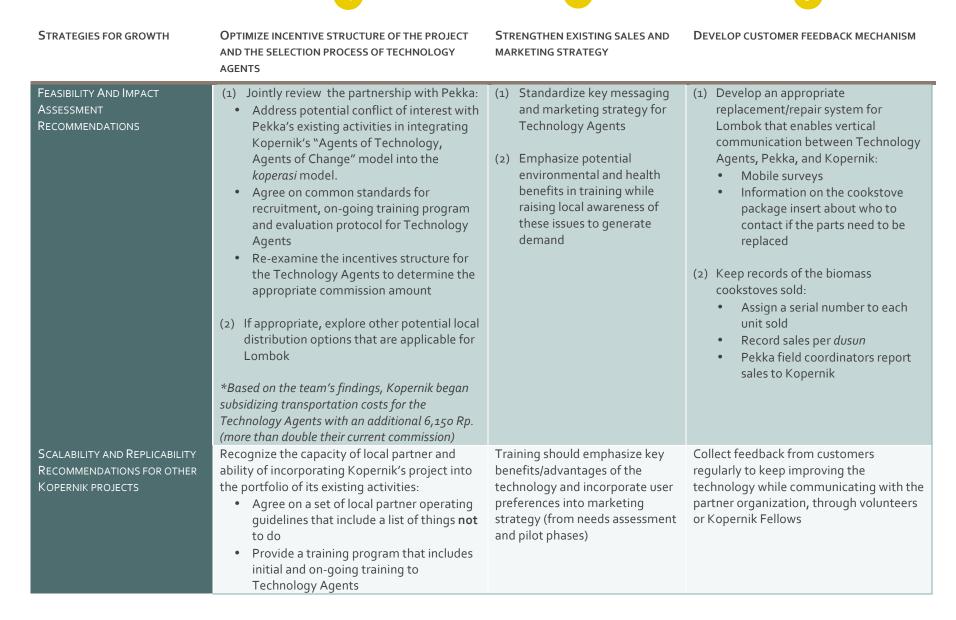
Adapt the existing technology to better fit the current context.

- Establish a Monitoring and Evaluation framework to measure impact indicators such as cooking time, fuel gathering time, etc.
- Provide users with the cookstove to use in return for collecting impact data on usage
- Conduct weekly follow up calls/visits with pilot users to collect feedback on cookstove usability

SCALABILITY AND REPLICABILITY
RECOMMENDATIONS FOR OTHER
KOPERNIK PROJECTS

Conduct a preliminary needs assessment with target customers in order to understand their needs, challenges faced in daily life and their willingness to pay

Pilot the technology in different seasons to ensure its optimal performance; monitor users' satisfaction and collect initial impact data on communities





This report would not have been possible without the assistance of many individuals at Kopernik, Pekka and Columbia University.

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Special thanks for all the Pekka members and the communities of Lombok, who opened their homes and hearts to us. We were grateful to have the opportunity to listen to their experiences and learn from their insights.

We would like to thank our two translators, Boma Harahap and Lalu Arif Rivaan, for their dedication to this project and for helping us to better understand the local Lombok context.

Lastly, we would like to thank Columbia University's School of International and Public Affairs (SIPA) faculty advisors and Eugenia McGill, whose knowledge and guidance made our work possible.



# Adat

Patrilineal Traditional norms in Lombok

#### Desa

Sub-Sub-District

#### Dusun

Sub-Sub-District; village

# Kecamatan

Sub-District; this is a subdivision of a regency (kabupaten)

# Koperasi

Cooperative; in the context of Pekka, a koperasi is a group of women engaged in savings and loan activity on basis of cooperative system



<sup>&</sup>lt;sup>1</sup> Kopernik, "Impact Summary" <a href="http://kopernik.info/page/impact-summary">http://kopernik.info/page/impact-summary</a> Accessed 30 April 2012.

<sup>&</sup>lt;sup>2</sup> Kopernik. <a href="http://kopernik.info/en-us/technology/biomass-stove-ubo3-1-stove">http://kopernik.info/en-us/technology/biomass-stove-ubo3-1-stove</a>>.

<sup>&</sup>lt;sup>3</sup> Kopernik. < http://kopernik.info/en-us/technology/water-filter>

<sup>&</sup>lt;sup>4</sup> National Geographic, Travel, Indonesia Facts.

<sup>&</sup>lt;a href="http://travel.nationalgeographic.com/travel/countries/indonesia-facts/">http://travel.nationalgeographic.com/travel/countries/indonesia-facts/</a>, retrieved on December 2, 2011.

<sup>&</sup>lt;sup>5</sup> Badan Pusat Statistik (Statistics Indonesia) < http://www.bps.go.id>, retrieved on May 2, 2012.

<sup>&</sup>lt;sup>6</sup> Foreign and Common Wealth Office of the United Kingdom, "Indonesia Country Profile".

<sup>&</sup>lt;a href="http://www.fco.gov.uk/en/travel-and-living-abroad/travel-advice-by-country/country-profile/asia-">http://www.fco.gov.uk/en/travel-and-living-abroad/travel-advice-by-country/country-profile/asia-</a> oceania/indonesia/> accessed 18 December 2011.

<sup>&</sup>lt;sup>7</sup> CIA World Fact Book, <https://www.cia.gov/library/publications/the-world-factbook/geos/id.html>, retrieved on Dec 2, 2011.

<sup>&</sup>lt;sup>8</sup> Foreign and Common Wealth Office of the United Kingdom, "Indonesia Country Profile".

<sup>&</sup>lt;sup>9</sup> Trading Economics, <<u>http://www.tradingeconomics.com/indonesia/gdp-growth</u>>, retrieved on May 2, 2012.

<sup>&</sup>lt;sup>10</sup> World Bank, "Country Data: Indonesia", <a href="http://data.worldbank.org/country/indonesia">http://data.worldbank.org/country/indonesia</a> Accessed on 17 December

<sup>&</sup>lt;sup>11</sup> Badan Pusat Statistik Provinsi Nusa Tenggara Barat (Central Bureau of Statistics West Nusa Tenggara Province <a href="http://ntb.bps.go.id/index.php/kependudukan/?menu=tampil&id\_artikel=229">http://ntb.bps.go.id/index.php/kependudukan/?menu=tampil&id\_artikel=229</a>, retrieved on December 3, 2011

<sup>&</sup>lt;sup>12</sup> Cynthia L. Hunter. "Local Issues and Changes: The Post-New Order Situation in Rural Lombok" SOJOURN Vol. 19, No. 1 (2004), 102

<sup>&</sup>lt;sup>13</sup> World Bank. Indonesia-Lombok Poverty Alleviation (pg. 1)

<sup>&</sup>lt;sup>14</sup> Demand-Side Management at Koperasi Listrik Perdesaan Sinar Rinjani, Indonesia. (pg. 41)

<sup>&</sup>lt;sup>15</sup> Ida Bagoes Mantra. "Illegal Indonesian labour movement from Lombok to Malaysia" Asia Pacific Viewpoint, Vol. 40, No. 1, April 1999, 61. The Kari Telle (2007): Entangled Biographies: Rebuilding a Sasak House, Ethnos, 72:2, 198. <

http://dx.doi.org/10.1080/00141840701387903> Accessed 10 December 2011.

<sup>&</sup>lt;sup>17</sup> Journal of Legal Pluralism (pg. 149)

<sup>&</sup>lt;sup>18</sup> Kari Telle, 198.

<sup>&</sup>lt;sup>19</sup> Journal of Legal Pluralism (pg. 150)

<sup>&</sup>lt;sup>20</sup> Badan Pusat Statistik (Statistics Indonesia) <a href="http://www.bps.go.id">http://www.bps.go.id</a>, retrieved on May 2, 2012.

<sup>&</sup>lt;sup>21</sup> J.C."To make a million people unpoor." The Economist. August 3, 2011.

<sup>&</sup>lt;a href="http://www.economist.com/blogs/banyan/2011/08/indonesias-poverty-line">http://www.economist.com/blogs/banyan/2011/08/indonesias-poverty-line</a>

<sup>&</sup>lt;sup>22</sup> A Citizen's Guide to Energy Subsidies in Indonesia, The International Institute for Sustainable Development, pg. 9

<sup>&</sup>lt;sup>23</sup> Tampubolon, Hans David. "Fuel price hike may increase poverty rate." The Jakarta Post. March 13, 2012.

<sup>&</sup>lt;a href="http://www.thejakartapost.com/news/2012/03/13/fuel-price-hike-may-increase-poverty-rate.html">http://www.thejakartapost.com/news/2012/03/13/fuel-price-hike-may-increase-poverty-rate.html</a>

<sup>&</sup>lt;sup>24</sup> < http://nt.punyablog.com/ourwords/environment/fuel-switch-from-kerosene-to-lpg>

<sup>&</sup>lt;sup>25</sup> World Bank. 2011. One Goal, Two Paths: Achieving Universal Access to Modern Energy in East Asia and the Pacific. (Washington, D.C: World Bank) 68.

<sup>&</sup>lt;sup>26</sup> Ibid 19.

<sup>&</sup>lt;sup>27</sup> WHO and UNDP. 2009. The Energy Access Situation in Developing Countries: A Review Focusing on the Least Developed Countries and Sub-Saharan Africa. New York: UNDP

<sup>&</sup>lt;sup>28</sup> World Bank. 2011. "Household Cook stoves, Environment, Health, and Climate Change: A New Look at an Old Problem." Paper prepared for the Climate Change Unit of the Environment Department, Washington, DC.

<sup>&</sup>lt;sup>29</sup> World Bank, One Goal 66.

<sup>&</sup>lt;sup>30</sup> *Ibid* 27.

<sup>&</sup>lt;sup>31</sup> Ibid



Based in Ubud, Indonesia, Kopernik was co-founded in 2010 by Ewa Wojkowska and Toshi Nakamura. The co-founders explain that Kopernik was founded with the following goals: "We connect life changing technologies to people who need them. We find simple solutions to some of the biggest problems facing the world today. We get technology to people so they can get themselves out of poverty."

Kopernik seeks to bypass the bureaucracy that usually plagues traditional development projects by

connecting the donors to the technology providers and technology seekers. By working with local organizations in developing countries, Kopernik is able to leverage their existing local knowledge of community needs and directly communicate to technology manufacturers to produce most relevant technologies. Small technology manufacturers in the private sector are now able to reach a market that they were never able to reach.

In Indonesia, Kopernik chooses to distribute locally produced or locally available technologies by partnering with Indonesian innovators and universities. Locally sourced technological innovations for development has four advantages. First, it stimulates and promotes local employment. Second, it is appropriately designed for the local context. Third, it is cheaper to ship and transport, and therefore purchase. Lastly, the technology can be locally fixed and maintained if it should break.

#### A WORD FROM THE KOPERNIK CO-FOUNDERS

"Central to our philosophy at Kopernik is that we view the poor communities we work with as our customers and we want them to be satisfied.

This means constantly asking for their feedback and rating of the technology, which we then publicly share – be it good or bad on our website – Amazon.com style.

This way, Kopernik is creating a vibrant technology marketplace for the developing world, where promising innovations will be further promoted, by virtue of customer satisfaction."

(2011 Annual Report)

#### THE KOPERNIK MODEL



#### **Technology Seekers:**

Local organizations in developing countries submit proposals for their technology needs to Kopernik

Source: http://kopernik.info/

#### Supporters:

People can 'shop' on the Kopernik website and buy the technology for Technology Seekers

#### Kopernik & Technology Providers:

The technology products are shipped to the local organization (Technology Seekers) Local organizations report back to supporters via Kopernik website. They send photos and provide feedback on the products



Pekka ("The Female Headed Household Empowerment Program") was born out of an idea of the National Commission on Violence Against Women (KOMNAS PEREMPUAN), to document the life of the widows in conflict regions, especially Aceh. The program aims to help widows gain access to resources and overcome adverse circumstances. The project has evolved to also focus on increasing access to assets for women who head households. Pekka was the first NGO in Indonesia to address large-scale development issues relating to widows and other types of marginalized women in post-conflict areas.

Indonesia has nearly 13.6 per cent of households (6 million households) headed by women. With existing discriminatory inheritance laws that consider men to be the only legal heads of households, female-headed households are at a disadvantage. The rights of women headed households are not on par with those of men, leading to gender discrimination. Additionally, women headed households are generally poor and have up to six dependents.

The lack of social and political structures to help these households leaves them in a vicious cycle of poverty. Households headed by widows are particularly vulnerable as the link between widows and poverty is well known. Due to cultural and religious norms that continue to hold men as the singular breadwinners of families, the loss of an adult male is economically devastating to families living in poverty.

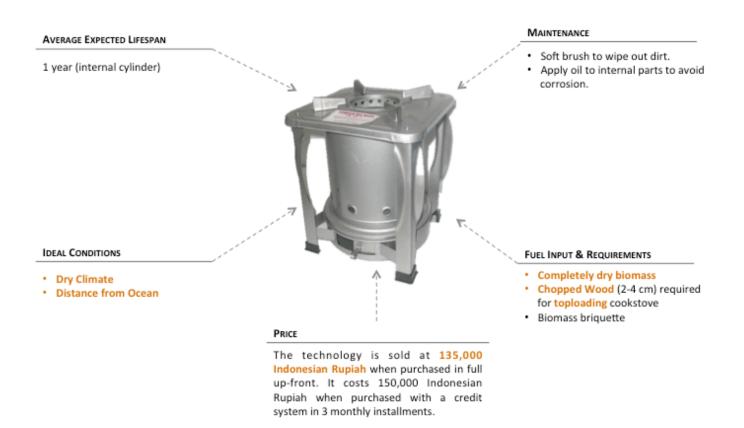
The high vulnerability of widows contributes to the generational cycle of poverty. Pekka aims to address the root causes of these vulnerabilities through vocational and technical training. It also offers women resources to help them gain financial literacy, save and even receive microloans. In its various efforts to empower women in these communities, Pekka supports about 6,500 rural widows in over 300 villages, 38 sub-districts and across 8 provinces.

# COMPARATIVE COOKING FUEL ENERGY EFFICIENCY

FUEL CONTENT	ENERGY (MJ / KG)	NEEDS (PER MONTHS)	PRICE	EXPENDITURE PER MONTH (RP)
LPG	46.6	12KG	4.200/KG	50,400
KEROSENE (KEROSENE)	43.2	15 Liter	5.000/Liter	75,000
COAL BRIQUETTES (CARBON)	29.0	22kg	2.500/kg	55,000
SOLID BIOMASS (BY USING THE STOVE-UB 03- 1) CUT THE FUEL TWIGS / WOOD	17.2	36kg	200/kg (in village) 500 / Kg (in town)	7,200 18,000
SOLID BIOMASS (BY USING THE UB-BIOMASS STOVES 03-1) BIOMASS PELLET MATERIAL	17.2 s/d 20	36 kg	1000/kg	36,000

Source: UB.03-1 Biomass Cookstove Technology Provider

# **UB.03-1** BIOMASS COOKSTOVE FEATURES AND TECHNOLOGY SPECIFICATIONS



ORGANIZATION NAME	PARADIGM PROJECT	Solar Sisters	LIVING GOODS
Type of organization	Low-profit, limited liability company (L3C)	US Based 501(c)3 Non-Profit	US Based 501(c)3 Non-Profit
Implementation country/region	Kenya, Guatemala, Haiti	Rural Africa - Uganda, Rwanda, South Sudan	Uganda
By the numbers/indicators	36,340 stoves distributed in 2011.	143 Entrepreneurs, and 17,605 Beneficiaries of solar light	600 sales agents
Technology type	Rocket stove	Solar technology (lamps etc.)	Clean-burning cookstoves
Process	Online donations to support training on usage, marketing, transportation and distribution of the stove. Additionally, the donations go towards the subsidy to make the stove affordable and the monitoring to ensure proper functioning of the stove.  Selling carbon offsets (125,000 tons of carbon offsets from its Kenya cookstove project in 2011 sold to Climate Neutral Group for an undisclosed price).	Woman-centered consignment distribution model. Build and extend the supply chain through women's rural networks.  1. Provision of Seed Capital investing in Solar Sister Entrepreneur, this provides the "business in a bag" - training, marketing and solar lamp inventory to seller. (this comes from online donations)  2. Entrepreneur sells lamps, earns a commission  3. Building of Sister Network  4. Entrepreneur pays for lamps	Micro-Franchise Business Model. Women work as independent agents and sell door to door. Agents receive below-market inventory loans for the "business in a bag" that includes uniforms, signs, locket, basic health and business tools. Trainings, refreshers, mentoring and monitoring are part of the sustainability of the model. Distribute a wide-variety of pro-poor products along health, energy and agricultural sectors. (economy of assortment)
"Buzz" /Accolades	<ul><li>Gold Standard certification*</li><li>Selection as a Lighthouse Project by the UN Momentum for Change</li></ul>		Economy of Assortment Open Source Approach



Stakeholder	ROLE/STATUS	CAPACITY/RESOURCES	Constraints	IMPORTANCE	INFLUENCE
PRIMARY					
KOPERNIK MANAGEMENT	Facilitator of technology transfer; Provider of the technology; Visionaries of overall project	Strong networks, knowledge of other technology delivery projects; International presence and leverage	Limited knowledge of on-the-ground activities	Medium	High
KOPERNIK STAFF	Day to day logistics/operations;  Maintain local relationships	Access to local networks; Operations knowledge	Limited decision making ability; Limited staff	High	Medium
PEKKA (ORGANIZATION)	Partner of Kopernik; Implementer of project; In charge of distribution channel; Run women's groups	Local knowledge of and access to existing women's groups; Contextual knowledge; Insight into the distribution process	No reach outside existing women's network	High	High
TECHNOLOGY AGENTS (ALSO PEKKA MEMBERS)	Sell the technology on consignment basis; Part of <i>koperasi</i> ; Intended beneficiary	Training that translates into knowledge of technologies, their use and maintenance; Social networks; Knowledge of successful selling techniques	Limited on-going training for existing Technology Agents; Lack of mobility; Lack of incentives;	High	High
PEKKA COORDINATORS	Field coordinators of Agents of Technology, Agents of Change project;	Social networks; Ability to strengthen women's groups	Potential conflict of interest	Medium	Medium
WOMEN'S COOPERATIVES (KOPERASI)	Organizes Pekka members; Manages savings and loans system of members	Strong social network	Potential conflict of interest	Medium	High
COMMUNITY					
END-USERS OF KOPERNIK TECHNOLOGIES	Intended beneficiary	Ability and interest in buying the technology	Financial constraints; Factors that influence purchasing decision	High	Medium

POTENTIAL END-USERS OF KOPERNIK TECHNOLOGIES	Target beneficiary	Ability and interest in buying the technology	Not aware of technology; May not be interested in technology; Technology is not applicable to them	Medium	Low
SECONDARY					
LOCAL COMMUNITY LEADERS	Provides public space for meetings	Potential to contribute resources; Potential to expand distribution channels	Lack of political will/interest in project	Low	High
DONORS FOR THIS PROJECT:  1. MARCIN CIESLIKOWSKI  2. DAIWA SECURITIES (JAPAN)  3. RUSSELL INVESTMENTS (JAPAN)	They provide the money; Want to know if their donation is having an impact	Financial resource; Social network and leverage	Limited on-the-ground knowledge of day to day activities; Knowledge limited to donor reports	High	TBD
TECH INNOVATORS	Makers of the stove and water filter; Want to know how effective their products are	Technological capacity	No implementation capacity; Limited resources (small/new organizations)	High	Low



#### **OVERARCHING RESEARCH QUESTION**

Is the "Change Agent" distribution model efficient?

#### Our project scope is based on 3 main research questions:

A. Is the technology being distributed "effectively"? (consignment model)

B. How does it impact those who are distributing the tech?
(Agents of Technology)

C. How does it impact those who are the end-users of the technology?

- Impact of Biomass stove
- Impact of water filter



# **LEVEL ONE ANALYSIS (JANUARY FIELD WORK)**

Background (context setting) and exploratory questions

- 1. How does the current model work?
- 2. Process map of "Supply Chain" that documents how cook stoves/water filters get from source to end-users (including cost/time/distance breakdown)
- 3. What does the training that Kopernik provides consist of? (time spent/themes covered/feedback of Agents?)
- 4. How do the technology fairs work?
- 5. How well are the agents able to choose the "right" or "most applicable" technology for their community?
- 6. What are some of the best practices of the consignment model?

- 1. What are the advantages of being Agents of Technology?
- 2. Who are the Agents of Technology in this distribution model?
- 3. Do women in Lombok have independent sources of income?
- 4. What are the existing sources of income for these women?
- 5. What is the context of gender norms in Lombok-Indonesia?
- 6. What is the legal framework in which women own assets, inheritance laws?

#### **Biomass Stove:**

- 1. What are the current methods of cooking?
- What are the alternative (innovative) technologies out there addressing same issue? (keep import/customs cost in mind)
- 3. What materials are available in communities to be used as fuel for cook stoves?
- 4. Are there existing (public) infrastructure projects that address this issue?

#### Water filter

- 1. What are the current methods of filtering water?
- What are the current sources of drinking water? (unfiltered or not)
- 3. What are the hazards of unfiltered water? (health implications)
- 4. What is the local perception about water cleanliness?
- 5. What are the alternative (innovative) technologies out there addressing same issue?
- 6. Are there existing (public) infrastructure projects that address this issue?

A. Is the technology being distributed "effectively"? (consignment model)

- B. How does it impact those who are distributing the tech?
  (Agents of Technology)
- C. How does it impact those who are the end-users of the technology?
- Impact of Biomass stove
- Impact of water filter







### LEVEL TWO ANALYSIS (JAN/MARCH FIELD WORK)

- Is there an advantage of women selling technologies over men? (business strategy)
- 2. Based on a comparative analysis of other consignment models, how does this distribution model compare?
- 3. What are the strategies used by the Agents of Technology for distribution?
- Looking at the existing context of Indonesian gender norms, how does this model empower these Agents of Technology to become more financially selfsufficient?
- 2. Does financial self-sufficiency enable these Agents of Technology to have decisionmaking power at the household level? And reduce dependency on others?
- For the households that have adopted the technology, how has it changed the following:
  - a. Time spent gathering cooking fuel
  - o. Money spent on cooking fuel
  - c. Time procuring water
- 2. What are the alternative uses of the technology?
- 3. What is the total cost of ownership of UB.03-1 biomass cook stoves?
- 4. Are there any unforeseen costs associated with owning a biomass stove?
- 5. Have there been maintenance issues? How do you address these issues?
- 6. How smooth was the technology adoption process for the household?
- 7. What are the sub-impacts on health and environment?
- 8. Are there any behavioral changes in due to the adoption of the technologies?



# SAMPLE FOCUS GROUP AND INTERVIEW GUIDES USED IN JANUARY FIELD WORK

STAKEHOLDERS
PEKKA AGENTS
PEKKA MEMBER (NON-AGENTS)
END-USERS OF TECHNOLOGIES
PEKKA MANAGEMENT
LOCAL COMMUNITY LEADERS

#### FOCUS GROUP GUIDE

#### **PEKKA AGENTS**

This guide should be used in order to conduct focus groups with Pekka technology agents. The team traveling in January will invite participants using the insight and direction of Kopernik staff, and local Pekka staff. Conducting multiple focus groups will allow the team to gain more insight, as well as to cross-examine main findings. We hope that inviting women in the same koperasi will encourage open dialogue due to their prior experience working together.

Date:
Time:
Location:
Interviewer:
Moderator:
Note-Taker:
Translator:
# of participants:
Names of participants (if necessary/appropriate)
Background/Introduction:
Good morning/afternoon. My name is and this is and We are
students from Columbia University in New York working with Kopernik and Pekka. We are helping identify the
impact of the biomass cookstoves and water filters in your community and on your day-to-day lives. We
appreciate your willingness to meet with us, and will try not to take up more than an hour and a half of your time.
If you wish, we will be happy to keep your identity anonymous, and to keep in confidence any personal or sensitive
information you share with us. Please don't hesitate to interrupt us at any time.
While we are in this space, you don't need to raise your hands; you can speak whenever you feel like it. We hope
that everyone will respect each other and take turns speaking. Also, this is a safe space and we would request to
keep the discussions that happen today within the group. Would we have your permission to tape record our conversation for our notes? Do you have any questions for us at this time?

Now we are going to start with everybody's introduction. The team members may know each other, but as facilitators we would like to get to know you a little better before we begin. Can you all share your names? After that, we will conduct a fun activity so we can all get to know you.

lce-breaker: [Circle exercise]

# **Introductory Questions:**

- 1) Do you personally use the biomass cookstove or Nazava water filter?
- 2) How long have you been in this koperasi?
- 3) Why did you join the koperasi?
- 4) How many members are in your koperasi?
- 5) What kind of activities do you do in your koperasi?
- 6) What is the role of Pekka in your koperasi? (Perception of Pekka)
- 7) One of Pekka's partners is Kopernik. Does anyone know anything about that organization? (are they aware of Kopernik)

# **Distribution Questions:**

8) Can you describe the process of selling a stove from start to finish?

- a) Where do you receive the technology from? (from the Pekka office? Is there a storage facility? Do you have to go yourself to pick the stoves up? How long does it take?)
- b) After someone places an order, how long does it take for them to receive the stoves?
- 9) Can you tell us about the communities the koperasis are in? (demographics, community norms, how far apart are the houses?)
- 10) Do you have any challenges in selling these technologies?
- 11) Do you think the technologies are affordable by the average family in your community?
- 12) How long have you been selling the technologies?
- 13) How many technologies have you sold so far?
- 14) How long does it take you to sell a product on average?
- 15) Do you demonstrate the product at each household?
- 16) How far do you travel to sell the technology? (how much time do you spend traveling? What is your mode of transportation?)
- 17) Can you describe any techniques that help you to sell your products?
- 18) How receptive are your potential customers to learning about the technologies?

#### **Training Questions:**

- 19) When you became a Tech Agent, did you receive training on how to demonstrate the product?
  - a) How to sell the product? How to maintain and repair the product? How to market products?
- 20) Following the training, did you feel comfortable being a technology agent and doing the tasks mentioned above?
- 21) As a technology agent, how many times have you been asked to do maintenance on stoves? What is the most common problem you have to address?

#### **Impact Questions:**

- 22) What do you do with the money you earn from selling the technologies?
- 23) How long does it take for you to receive the commission after you make the sale?
- 24) What does your typical day look like?
  - i) Has it changed after you became a tech agent?

#### Conclusion:

Thank you so much for taking the time to speak with us today. Is there anything you would like to add or ask us? If we have further questions, would you mind if we contact you again? Thank you again for the insights. (provide contact information). Please feel free to contact us again.

[approach one or two more members who were outspoken/more comfortable during the meeting to ask whether we could accompany them on a sales trip]

## FOCUS GROUP GUIDE

# PEKKA Members (Those who are non-agents)

This guide should be used to conduct focus groups with PEKKA members who are not "agents of change". The team traveling in January will invite participants using the insight and direction of Kopernik staff, and local PEKKA staff. Conducting multiple focus groups will allow the team to gain detailed insight into the roles of PEKKA members who are not agents. The information gathered aims to capture the dynamics of the relationship between agents and non-agents and the reasons behind why some women become agents and others do not. This will inform the analysis of the strengths as well as the limitations of the distribution model by identifying potential barriers to becoming agents.

-				
Date:				
Time:				
Location:				
Interviewer:				
Moderator:				
Note-Taker:				
Translator:	-			
# of participants:				
Names of participants (if necessary/appro				
Background/Introduction:				
Good morning/afternoon. My name is		and this is	and	. We are
students from Columbia University in Ne				
impact of the biomass cookstoves and wa				
appreciate your willingness to meet with				
If you wish, we will be happy to keep you				
information you share with us. Please do				my personal or sensitiv
While we are in this space, you don't need	d to raico w	our hande, vou ca	n speak whonover you	ı faal lika it Wa hana
that everyone will respect each other and				
keep the discussions that happen today v				to tape record our
conversation for our notes? Do you have	any questic	טווג וטו טג מנ נוווג נ	imer	
Now we are going to start with everybod	y's introduc	ction. The team n	nembers may know ea	ach other, but as
facilitators we would like to get to know	•		•	
that, we will conduct a fun activity so we	,		,	,
Ice-breaker: [Circle exercise]				
Introductory/Background Questions:				

- 1) What is your occupation?
- 2) What does your typical day look like?
- a) When do you complete work daily and come back home?
- b) What are your responsibilities within the household after that?
- 3) How many women do you know (from your village/community) who are PEKKA members as well?

# **PEKKA** questions:

- 4) How long have you been a PEKKA member?
- 5) Why did you join PEKKA?

- 6) What kind of activities do you do as part of PEKKA?
- 7) Can you tell us about your community? [demographics, community norms, how far apart are the houses? Etc.]
- 8) One of Pekka's partners is Kopernik. Does anyone know anything about that organization? (Perception of Kopernik and its role)
- g) Do you know about the koperasis of women selling the biomass stove and water filters?

# PEKKA agents of change project perceptions:

- 10) What do you think about the PEKKA Agents of Technology project?
- a) Within PEKKA, how do you perceive PEKKA Agents of Technology versus those who are not?
- b) Do PEKKA Agents of Technology have more responsibilities than other PEKKA members?
- c) Is there prestige associated with being a PEKKA Agent of Technology within PEKKA?
- i) Can you elaborate on what type of prestige PEKKA Agents have (if any) within PEKKA?
- d) Is there community-level prestige associated with being a PEKKA Agent of Technology?
  - i) Can you elaborate on what type of prestige PEKKA Agents have (if any)?
- 11) Do PEKKA Agents of Technology have more community influence than other PEKKA members living and working in your community?
- a) Can you elaborate more on this? What type(s) of influence do they have?

(*Example Prompt:* Are their opinions valued higher, do they have credibility to promote community development projects, etc?)

- 12) Were you given an opportunity to become an agent?
  - i) If yes, why did you choose not to be a tech agent?
- 13) What are the advantages and the disadvantages of being an agent?
- 14) Why would someone choose to be a tech agent?
- 15) Are you thinking about becoming a tech agent sometime in the future?
- 16) Do you personally use the biomass cookstove?
- 17) Do you personally use the Nazava water filter?
- 18) Do you think the technologies sold by the Agents of Technology are affordable by the average family in your community?

#### Misc. Questions:

- 19) Did you attend the tech fair?
  - i) How helpful is the tech fair in addressing the needs of the community?

# Conclusion:

Thank you so much for taking the time to speak with us today. Is there anything you would like to add or ask us? If we have further questions, would you mind if we contact you again? Thank you again for the insights. (provide contact information). Please feel free to contact us again.

# FOCUS GROUP GUIDE

# **END USERS OF KOPERNIK TECHNOLOGIES**

This guide should be used in order to conduct focus groups with Kopernik technology end-users (regardless of gender). The two technologies include the UB.03-1 Biomass Cook Stove and Nazava Water Filter as of today. The team traveling in January will invite end-users using the technologies to provide insight on the technologies from a consumer perspective. Conducting multiple focus groups with end-users will allow the team to gain more insight into the demographic information and representative profiles end-users, as well as to collect preliminary data that is required for the actual impact assessments in March.

Date:	
Time:	
Location:	
Interviewer:	
Moderator:	
Note-Taker:	
Translator:	
# of participants:	
Names of participants (if necessary/appropriate)	
Background/Introduction:	
Good morning/afternoon. My name is and this is and V	Ve are
water solutions to the local communities in Indonesia, such as biomass cook stoves and water filters. We as working with Kopernik's partner, PEKKA, a local NGO that is comprised of single women heads of households the local communities. We are supporting them to better understand the situations faced by households community in terms of energy and clean water sources. We appreciate your willingness to meet with us, at try not to take up more than an hour and a half (90 minutes) of your time. If you wish, we will be happy to your identity anonymous, and to keep in confidence any personal or sensitive information you share we Please don't hesitate to interrupt us at any time.	olds in in the nd will o keep
While we are in this space, you don't need to raise your hands; you can speak whenever you feel like it. We that everyone will respect each other and take turns speaking. Also, this is a safe space and we would require the discussions that happen today within the group. Would we have your permission to tape reconversation for our notes? Do you have any questions for us at this time?	est to
Now we are going to start with everybody's introduction. Some of you may know each other already, facilitators we would like to get to know you a little better before we begin. Can you all share your names? that, we will conduct a fun activity so we can all get to know you.	
Ice-breaker: [Circle exercise]	
Introduction Questions:  1) What is your occupation?  2) What does your typical day look like?	

**Technology Related Questions:** 

3) Can you tell us which technologies you have purchased for your home?

#### Biomass Cook Stove Background:

- 4) For those of you who have purchased the biomass cook stove, can you tell us if you use less fuel now than prior to using the cook stove?
- 5) Can you tell us about how you used to cook prior to purchasing the cook stove?
- 6) Can you describe how the biomass cook stove has affected your:
- a) cooking practices?
- b) your comfort while cooking?
- c) time spent gathering fuel sources?

# Water Filter Background

- 7) For those of you who have purchased the water filter, can you tell us about your access to clean drinking water prior to purchasing the water filter?
- a) Where did you collect water from?
- i) Is this the nearest water source?
- b) How far did you travel to collect the water?
- c) On average, how long did it take you to collect water from the nearest water source?
- d) How often do you collect water?
- 8) Can you tell us more about your access to drinking water in your community?
- a) Are there particular times of the year where access to drinking water is a challenge?
- g) After purchasing the water filter, how has your access to clean drinking water changed?
- a) How many of your household members utilize this technology?
- b) Do all household members utilize filtered water as their only source of drinking water? [If not]-- What other sources do they drink in addition to the filtered water?
- 10) Can you tell us some of the benefits of drinking filtered water?

#### **Purchasing Experience**

- 11) How did you come to hear about the biomass cook stove?
- 12) How did you come to hear about the water filter?
- 13) Did a PEKKA member come to your house to directly speak with you about these two technologies?
- 14) Do you think the technologies sold by the Agents of Technology are affordable by the average family in your community?
- a) If not: What would you consider a reasonable price for the biomass cook stove and the water filter?

#### **Technology Experience**

- 15) Did you feel comfortable using the biomass cook stove upon purchase?
- 16) Did you feel comfortable using the water filter upon purchase?
- 17) How long have you been using the biomass cook stove?
- a) How often do you use the biomass cook stove? (once a day, once ever other day, etc?)
- b) Have you ever stopped using the biomass cook stove? If so, Why?
- 18) How long have you been using the water filter?
- a) How often do you use the water filter?
- b) Have you ever stopped using the water filter? If so, Why?
- 19) Have you ever had to repair either of your technologies?
- a) If so, how did you address the issue?
- b) How much did you pay to fix or maintain the product?
- c) Who fixed the product (Ask whether it was a PEKKA agent or someone else).
- 20) Do you have any suggestions to make the technologies more user friendly?
- 21) Would you recommend the biomass cook stove to other members in your community?

- a) If yes, why?
- b) If not, why?
- 22) Would you recommend the water filter to other members in your community?
- a) If yes, why?
- b) If not, why?

#### Conclusion:

Thank you so much for taking the time to speak with us today. Is there anything you would like to add or ask us? If we have further questions, would you mind if we contact you again? Thank you again for the insights. [Provide contact information] Please feel free to contact us again.

# **I**NTERVIEW GUIDE

# PEKKA MANAGEMENT

Dat	e:
	ne:
	ation:
	erviewer:
Not	re-Taker:
Tra	nslator:
Intr	roduction:
God	od morning/afternoon[ Mr./Ms. name of informant] My name and
hea	are students from Columbia University in New York working with Kopernik and Pekka. As you may have rd from Cindy, we are conducting a rapid assessment of both the impact of the technologies sold by Pekka mbers, and the impact of the distribution model that Pekka and Kopernik use.
bet and tea	ink you very much for taking the time to meet with us. We were hoping to take about an hour of your time to ter understand Pekka's model and its relationship with the community. We will be visiting various koperasi, conducting interviews and focus groups with members of the community over the next 10 days. Three other m members will follow up with in-depth surveys and continue our analysis during their trip in March. Our team then use this information for a final report that will help Kopernik improve their distribution strategy.
hor	ore we begin, would you mind if we record this conversation for our notes? We are really hoping for your lest feedback. If there is anything that you feel uncomfortable sharing, please let us know at any time during interview process. Do you have any initial questions for us?
Bac	kground:
	Can you tell us about yourself? How long have you been working for Pekka? What is your role as ""[role/title of informant]?
2)	Why did Pekka choose to partner with Kopernik?
3)	Why does Pekka want to implement this project?
4)	What is Pekka's internal organizational structure?
5)	How many staff are there on this project?
6)	Do you see a distinction between Pekka and the koperasi? Do the women see a distinction? Is there more group unity among members of koperasi vs. the larger Pekka group members?
Dis	tribution Process Questions:
7)	What is your role in the distribution model?
8)	How do you see Pekka's role?
9)	Can you describe the various steps involved in the distribution process? (cost, time, participants, location, resources needed)
10)	What are the most successful components of the distribution process? What are the areas that can be
	improved upon?
11)	What do you think is the difference between current/continuing agents and one-time agents?
12)	At what points in the distribution process is money being exchanged?
a)	How do tech agents receive commission?
b)	How do payment plans by end users affect how the agents are being paid?

# **Community Questions:**

13) What is the role of the koperasi in the women's lives? What are the women's roles within the koperasi?)

14) Are there advantages to using women's groups to distribute this technology?

# **Impact Questions:**

- 15) What do you think about the technology fair? Are they useful?
- 16) What do you think about the training that the agents receive? Was it useful?
- 17) What do you think the impact of the technologies?
- 18) What do you think are the biggest challenges of the technologies?

# **Pricing Questions:**

- 19) How was the pricing of the technology established?
- 20) Can you describe the commission process? (what is the rationale behind the commissions at each stage?)
- 21) What are the payment options? (the official and unofficial options?)

#### Conclusion:

\_\_\_[Mr./Ms. name of informant]\_\_\_\_. Thank you so much for taking the time to speak with us today. Is there anything you would like to add or ask us? Here is a list of the people we will be interviewing. Do you have any suggestions for anyone else we should contact? If we have further questions, would you mind if we contact you again? Thank you again for the insights. (exchange contact information). Please feel free to contact us again.

# INTERVIEW GUIDE

#### LOCAL COMMUNITY LEADERS

Date	
Time:	
Location:	
Interviewer:	
Note-Taker:	
Translator:	
Introduction:	
3	ame of informant] My name is and this is at Columbia University in New York, and we are conducting a rapid
assessment of both the impact of the tech model that Pekka and Kopernik use.	nologies sold by Pekka members, and the impact of the distribution
We would like to ask you a few questions a	bout your community and its well-being. We understand that you are a

Before we begin, would you mind if we record this conversation for our notes? We do not work for Kopernik or PEKKA so we encourage you to speak freely and honestly. If there is anything that you feel uncomfortable sharing, please let us know at any time during the interview. Do you have any initial guestions for us?

prominent community leader and that you play an integral role in your community's progress and development. Thank you very much for taking the time to meet with us. We were hoping to take about an hour of your time.

#### Background:

Data.

- 1) Can you tell us about your current role in the community as a community leader?
- a) How long have you been in this role as a [fill in position]?
- b) What are your responsibilities?

# Community Background:

- 2) Can you tell us about your community in terms of its demographics?
- a) What do most people do for a source of living?
- b) Can you describe the typical household?
- 3) What are some of the most pressing issues in addressing community development?
- a) What areas need particular attention? (Prompt examples: Health, education, nutrition, energy sources, etc)
- 4) What organizations currently work with your community or its members?
- a) What type of work are they involved in? (Examples: Economic development, social issues, civic participation, health & nutrition initiatives, energy and environment initiatives, etc)
- 5) Can you tell us about previous development initiatives that took place in your community?
- a) What were the most successful initiatives?
- b) What were the least successful initiatives?
- c) What impact did it have on your community?

#### PEKKA/Agents of Technology Project Awareness

- 6) Have you heard of PEKKA?
- a) If so, can you tell us what you know about PEKKA?
- b) Does PEKKA work with members of your community?
- 7) How do you believe community members perceive members of PEKKA?
- 8) Recently, Kopernik and PEKKA introduced the "Agents of Technology, Agents of Change" project in Lombok to distribute low-cost, life changing technologies in Lombok. Are you aware of this project?

- a) Do PEKKA members reside in your community?
- b) Do PEKKA members sell Kopernik technologies (the water filter and/or the biomass cook stove) in your community?
- i) Do you personally have either of these two technologies?
- 9) For those households in your community that have purchased the biomass cook stove, what is the overall community reaction?
- 10) For those households in your community that have purchased the water filter, what is the overall community reaction?

# Low-Cost Technologies and Community Development

contact information). Please feel free to contact us again.

- 11) How do you think projects like these (the Agents of Technology, Agents of Change) can assist in community development?
- 12) How do you think the two selected technologies (the biomass cook stove and water filter) address your community's pressing needs for sustainable energy sources and clean drinking water? Are they effective and efficient?
- a) [If they indicate no] What other type of low-cost technologies would be most relevant for your community's development?
- 13) Is there anything else you would like to share with us today regarding your community's development?

Conclusion
[Mr./Ms. name of informant] Thank you so much for taking the time to speak with us today. Is there
anything you would like to add or ask us? Do you have any suggestions for anyone else we should contact? If we
have further questions, would you mind if we contact you again? Thank you again for the insights, (exchange

# SAMPLE SURVEY QUESTIONNAIRES USED IN MARCH FIELD WORK

STAKEHOLDERS
BIOMASS COOKSTOVE END USERS
NON-USERS
TECHNOLOGY AGENTS

# SURVEY QUESTIONNAIRE COMMUNITY MEMBER SURVEY (BIOMASS COOKSTOVE USER)

#### Disclaimer

This questionnaire should be used in order to conduct one-on-one surveys with biomass cookstove users. The purpose of this survey is to better understand the profile of consumer and potential consumer.

\*\* Question numbers are not in sequential order as questions were added and deleted during the survey process and later.

# Background

We are students from Columbia University in New York researching with Kopernik and Pekka. We are helping identify the impact of UB.03-1 Biomass cookstove in your community.

All the information that we get through this survey will be used to enhance Kopernik and Pekka's UB.03-1 Biomass cookstove program. We appreciate your willingness to meet with us, and will try not to take up more than **1 hour** of your time.

If you wish, we will be happy to keep your identity anonymous, and we promise to keep in confidence any personal or sensitive information you share with us. Please don't hesitate to interrupt us at any time.

Do you have any questions for us so far?

Date:	
Start tir	ne:
End tim	e:
Sub-dis	trict (Kecamatan):
Village	(Desa):
Survey	conductor (Dusun):
Transla	tor:
RESPO	NDENT INFORMATION (Survey #:)
1.	Prefix:
2.	First Name:
3.	Family Name:

_		
4.	Age:	

NO.	QUESTION	RESPONSE
5	What is your highest level of education?	
6	What is your marital status?	1. Single
[ALL]	(Check only ONE)	2. Married
		3. Widowed
		4. Divorced
		5. Do not wish to answer
7	How many people live in your house?	
[ALL]	(Not including yourself)	
8	Do you earn/make money?	1. Yes 2. No
[ALL]	,	
9	How do you make money?	1. I sell snacks
[ALL]	Choose all that apply.	2. I sell small hand-made goods
		3. I tailor clothes
	Note: All options should be read.	4. I have my own shop
		5. Teacher
		6. I sell other small goods (ex. Chopped wood)
		7. I work on a farm during harvest season
		8. My family owns land which I farm on
		9. I have a <i>kebun</i> (fruit garden)
		10. Other:

10	On average, how much do	you earn?		
[ALL]	Income Generating Choices selected in Question 10	What months of the year do you do this activity?	What do you earn during this time on a daily/weekly basis?	Additional Notes
	1.		Daily: Weekly: Monthly:	
	2.		Daily: Weekly: Monthly:	
	3.		Daily: Weekly: Monthly:	
11 [ALL]	Are there any other peopl If so, who they are, what of the so, who they are, what of the so, who they are, what of the so, who they are, who is a solution of the solution of	do they do to make mone	o your house? ey, and how much they earn	?
	Income earning HH member (not including you)	How do they make money?	How much do they earn?	Units (specify) [i.e., Daily/weekly]
	EXAMPLE	Farmer Ojek driver	30K during harvest season (5 months/year) 40K (1 or 2 days/week)	Daily Daily
	#1			
	#2			
	#3			

# COOKING HABITS AND STOVE OWNERSHIP

No.	Questions	Response
12	How many times do you use a stove each day?	1 2 3 4+
[ALL]		
13	How many cook stoves do you currently own?	1 2 3 4 5+
[ALL]		
14	Which stoves do you currently OWN? (check	1. LPG 2. Kerosene 3. Brick 4. Biomass
[ALL]	all that apply)	
16	Which one do you use the most during the	1.LPG 2. Kerosene 3. Brick 4. Biomass
[ALL]	WET (RAINY) SEASON?	5.Other:
16.1	Which one do you use the most during the	1.LPG 2.Kerosene 3.Brick 4.Biomass
[ALL]	DRY SEASON?	5.Other:
17	How long does it take you each time you cook	1. o- 15 minutes each time
[ALL]	on the stove?	2. 16-30 minutes each time
		3. 31- 45 minutes each time

	T	
		4. 45 minutes – 1 hour each time
	(Prompt: How long is the cook stove on?)	5. More than 1 hour each time
		(Specify Time:)
18	Have you received an LPG stove as part of the	1. Yes 2. No
[ALL]	government program?	2.110
		(antar number of days)
19	How many days does the LPG cylinder last	(enter number of days)
(LPG)	you?	
20	What size cylinder do you own?	(enter cylinder size)
(LPG)		
21	How much does it cost to refill it?	(enter INR amount)
(LPG)		
22	How many liters of kerosene do you usually	(enter liters of kerosene purchase)
(KSN)	buy at one time?	(effect ficers of Keroseffe potendse)
	,	(autou # af daya)
23	How long does that amount last you?	(enter # of days)
(KSN)		
24	How much does that amount cost?	(enter INR amount)
(KSN)		
25	Do you collect wood for cooking?	1.Yes
[ALL]	,	2.No (>>Q.28)
[]		3.I don't, but someone else in my home does
26	If yes, how often do you collect firewood?	1. Every day
20	if yes, now often do you collect firewood?	
		2. Every other day
		3. 3 times a week
		4. 2 times a week
		5. 1 time a week
27	If yes, how long does collecting firewood take	1. Less than 30 minutes
,	you each time?	2. 30 minutes to 1 hour
	(This includes time required to walk to site,	3. 1 hour – 1 hour 30 minutes
	collecting, and returning back home)	4. 1 hour 30 minutes to 2 hours
	confecting, and retorning back nome)	
	D 1 C 12	5. More than 2 hours (Enter amount)
28	Do you buy firewood?	1.Yes
[ALL]		2.No (>>Q.31)
29	If yes, how often do you buy firewood?	1. Every Day
		2.3 times a week
		3.1 time every week
		4.1 time every two weeks
		5.1 time every month
20	How much do you spand on it assh time?	
30	How much do you spend on it each time?	(Enter INR Amount)
31	Compared to the brick cookstoves, how much	1. More
[ALL]	firewood do you use with the biomass stove?	2.Less
		3. About the same
32	How much time does it take to chop the wood	1.5-10 minutes
[ALL]	for the biomass stove?	2.10-20 minutes
[]		3. 20-30 minutes
	Have the adaptation of the state of the stat	4.1 hour
32.1	How often do you chop firewood for the	1. Once a day
[ALL]	biomass stove?	2.Once a week
		3. Twice a week
		4.Other:

# **CUSTOMER PREFERENCE**

No.	Questions	Response
33 [ALL]	What affects whether you will buy a cook stove?  Of the ones you selected, can you tell us which ONE is MOST important in helping you decide whether to buy a cookstove or not?	<ol> <li>Cost of each unit of cookstove</li> <li>Cost of Fixing</li> <li>Time required for cleaning</li> <li>Easy-to-use design</li> <li>Good looking design</li> <li>Cost of fuel required for the cookstove</li> <li>Time spent gathering fuel (ex. Wood, leaves, etc)</li> <li>Durability of the cookstove</li> <li>Good for environment</li> <li>Good for health (i.e., less smoke when cooking)</li> <li>Recommendations from someone who uses the stove</li> <li>Friendship/good personal relationship with the seller</li> <li>Other:</li> </ol>
34 [ALL] 35	Is there a particular time of the year that you would be more likely to buy a cookstove?  Which season are you most likely to buy a cook stove?	1. Yes (>>Q.35 & 36) 2. No (>>Q.37)  1. No preference in when I purchase a stove 2. Rainy season 3. Dry season 4. Harvest season (Months:
36	Why are you more likely to buy a cookstove during that time?	
37 [ALL]	If price of the biomass cookstove, LPG stoves, Kerosene stoves and brick stoves were all free and the cost of using them were the same, which stove would you choose?  Can you please tell us why you would choose	1. Biomass 2. LPG 3. Kerosene 4. Brick
[ALL]	that stove?	

# AWARENESS ABOUT BIOMASS COOKSTOVE

No.	Questions	Response
39 [ALL]	How did you hear about the biomass cookstove?	<ol> <li>I saw a community member using one in their home</li> <li>My friend owns one</li> <li>My relative owns one</li> <li>A Pekka member approached me</li> <li>Other:</li> </ol>
40 [ALL]	Have you personally used a biomass cookstove at an acquaintance's, friend's or family member's home before buying the cookstove for yourself?	1. Yes 2. No
41 [ALL]	What are the different types of fuel you use for the biomass cookstove? (Select all that apply)	<ol> <li>Firewood</li> <li>Leaves and husks</li> <li>Cobs of corn</li> <li>Plastic waste</li> <li>Kerosene</li> <li>LPG fuel</li> </ol>

	7. Coal
--	---------

# INTERACTION WITH PEKKA TECHNOLOGY AGENTS

No.	Questions	Response
42	What benefits do you see in the biomass	1. Less smoke
[ALL]	cookstove? (Check all that apply)	<ul> <li>2. Ability to use other types of fuel for the cook stove such as leaves and agricultural waste</li> <li>3. Less time required to collect firewood</li> <li>4. Positive environmental impacts</li> <li>5. I do not see any benefits of the biomass cookstove</li> <li>6. I don't remember</li> <li>7. Safety</li> <li>8. Efficiency (Long duration of fire)</li> <li>9. Other</li> </ul>
43 [ALL]	Did the Tech Agent demonstrate the biomass cookstove to you?	1. Yes 2. No

# PURCHASING DECISION (if approached by a PEKKA member)

No.	Questions	Response
44 [ALL]	Are you a Pekka Member?	1. Yes 2. No
45 [ALL]	Do you think the PEKKA Tech Agent was able to clearly explain the benefits of the cookstove to you?	1. Yes 2. No
46 [ALL]	If you need an additional stove, would you purchase another biomass stove?	1. Yes (>>Q.48) 2. No
47	If no, why not?	
49	Did you purchase the stove using this 3-month installment plan?	1. Yes (>>Q.50) 2. No (>>Q.51)
50	If yes, why?	<ol> <li>Not enough money at one time</li> <li>Other:</li> </ol>

#### **UTILIZATION OF THE BIOMASS STOVE**

No.	Questions	Response
51 [ALL]	How do you clean the biomass stove?	
52 [ALL]	Have you ever had to replace any part of the stove?	1. Yes 2. No (>>Q.56)
53	If yes, which part?	
54	Was it quick/easy to replace?	1. Yes 2. No (Why?)
55	Do you know how to get this part?	
56 [ALL]	What are some improvements for the stove you would recommend?	
57 [ALL]	What challenges have you had in using the stove?	

# \*\*END OF SURVEY\*\*

# SURVEY QUESTIONNAIRE COMMUNITY MEMBER SURVEY (NON-BIOMASS COOKSTOVE USER)

#### Disclaimer

This questionnaire should be used in order to conduct one-on-one surveys with non-biomass cookstove users. The purpose of this survey is to better understand the profile of consumer and potential consumer.

\*\* Question numbers are not in sequential order as questions were added and deleted during the survey process and later.

#### Background

We are students from Columbia University in New York researching with Kopernik and Pekka. We are researching low cost technologies distributed by Kopernik and are interested in learning more about the communities that Kopernik and Pekka work with.

All the information that we get through this survey will be used to enhance Kopernik and Pekka's UB.03-1 Biomass cookstove program. We appreciate your willingness to meet with us, and will try not to take up more than **1 hour** of your time.

If you wish, we will be happy to keep your identity anonymous, and we promise to keep in confidence any personal or sensitive information you share with us. Please don't hesitate to stop us at any time.

Date:
Start time:
End time:
Sub-district (Kecamatan):
Village (Desa):
Survey conductor (Dusun):
Translator:

Do you have any questions for us so far?

# RESPONDENT INFORMATION (Survey #: \_\_\_\_\_)

- 1. Prefix:
- 2. First Name:
- 3. Family Name:4. Age:

NO.	QUESTION	RESPONSE
5 [ALL]	What is your level of schooling?	
6 [ALL]	What is your marital status? (Check only <b>ONE</b> )	<ol> <li>Single</li> <li>Married</li> <li>Widowed</li> <li>Divorced</li> <li>Do not wish to answer</li> </ol>
7 [ALL]	How many people live in your house?  (NOTE: Not including yourself)	
8 [ALL]	Do you make/earn money?	1. Yes 2. No (>> Q 11)
9 [ALL]	HOW do you make money? (Check all that apply or write in your answer)	<ol> <li>I sell snacks</li> <li>I sell small hand-made goods</li> <li>I tailor clothes</li> <li>I have my own shop</li> <li>Teacher</li> <li>I sell other small goods (ex. Chopped wood)</li> <li>I work on a farm during harvest season</li> <li>My family owns land which I farm on</li> <li>I have a kebun (fruit garden)</li> </ol>
		Other job/source of money:

10 [ALL]	For each of the activities you mentioned, please tell us in what months of the year you do that activity and how much you make on a daily/weekly basis.				
[/\[]	Income Generating Choices selected in Question 9	What months of the year do you do this activity?	What do you earn during this time on a daily/weekly basis?	Additional Notes	
	1.		Daily: Weekly: Monthly:		
	2.		Daily: Weekly: Monthly:		
	3.		Daily: Weekly: Monthly:		
11 [ALL]	Are there any other people who bring in money into your house?  If so, who they are, what do they do to make money, and how much they earn?  1. Yes  2. No (>> Q 12)				
	Income earning HH member (not including you)	How do they make money?	How much do they earn?	Units (specify) [i.e., Daily/weekly]	
	EXAMPLE	Farmer Ojek driver	30K during harvest season (5 months/year) 40K (1 or 2 days/week)	Daily Daily	
	#1				
	#2				
	#3				

# COOKING HABITS AND STOVE OWNERSHIP

No.	Questions	Response
12 [ALL]	How many times do you cook each day?	0 1 2 3 4+
13 [ALL]	How many cook stoves do you currently own?	0 1 2 3 4 5+

14 [ALL]	Which type stoves do you currently OWN?	1. LPG 2. Kerosene
[,]	(Check all that apply)	3. Brick
16 [ALL]	Of the stoves that you currently use, which type of stove do you use the <b>most</b> in the RAINY season?	4. Biomass  1. LPG  2. Kerosene  3. Brick  4. Other:
16.2 [ALL]	Of the stoves that you currently use, which type of stove do you use the <b>most</b> in the DRY season?	5. LPG 6. Kerosene 7. Brick 8. Other:
17 [ALL]	How long does it take you each time you cook on a daily basis?  (Prompt: How long is the cook stove on?)	<ol> <li>0- 15 minutes each time</li> <li>16- 30 minutes each time</li> <li>31- 45 minutes each time</li> <li>45 minutes - 1 hour each time</li> <li>More than 1 hour each time</li> <li>(Specify Time:</li> </ol>
18	Have you received an LPG stove as part of the government	
(LPG)	program for free?  How many days does the LPG cylinder last you?	1. Yes 2. No
19 (LPG)	now many days does the LFG cylinder last you?	(enter number of days)
20	What size cylinder do you own?	(enter
(LPG)		cylinder size)(Unit Size)
(LPG)	How much does it cost to refill it?	•
21	How much does it cost to refill it?  How many liters of kerosene do you usually buy at one time?	(Unit Size)
21 (LPG)	How many liters of kerosene do you usually buy at one	(Unit Size)(enter INR amount)
21 (LPG) 22 (Keros ene) 23 (Keros	How many liters of kerosene do you usually buy at one time?	(Unit Size)(enter INR amount) (enter liters of kerosene purchase)
21 (LPG) 22 (Keros ene) 23 (Keros ene) 24 (Keros	How many liters of kerosene do you usually buy at one time?  How long does that amount last you?	(Unit Size)(enter INR amount) (enter liters of kerosene purchase)(enter # of days)

		<ul><li>3. 3 times a week</li><li>4. 2 times a week</li><li>5. 1 time a week</li></ul>
27	If yes to question 25,  How long does collecting firewood take you each time?  (This includes time required to walk to site, collecting, and returning back home)	<ol> <li>Less than 30 minutes</li> <li>30 minutes to 1 hour</li> <li>1 hour – 1 hour 30 minutes</li> <li>1 hour 30 minutes to 2 hours</li> <li>More than 2 hours</li></ol>
28	Do you buy firewood?	1. Yes (>> Q 29) 2. No (>> Q 31)
29	If yes, how often do you buy firewood?	<ol> <li>Every Day</li> <li>3 times a week</li> <li>1 time every week</li> <li>1 time every two weeks</li> <li>1 time every month</li> </ol>
30	How much money do you spend on it each time?	(Enter INR Amount)

## **CUSTOMER PREFERENCE**

No.	Questions	Response
31 [ALL]	What affects whether you will buy a cook stove?  Follow-up: Of the ones you selected, can you tell us which ONE is MOST important in helping you decide whether to buy a cookstove or not?	<ol> <li>Cost of cook stove</li> <li>Cost of Maintenance</li> <li>Time required for maintenance</li> <li>Easy-to-use design</li> <li>Good looking design</li> <li>Cost of fuel required for the cookstove</li> <li>Time spent gathering fuel (ex. Wood, leaves, etc.)</li> <li>Durability of the cookstove</li> <li>Good for environment</li> <li>Good for health (i.e., less smoke when cooking)</li> <li>Recommendations from someone who uses the stove</li> <li>Friendship/good personal relationship with the seller</li> <li>Other:</li> </ol>
3 <sup>2</sup> [ALL]	Is there a particular time of the year that you would be more likely to buy a cookstove?	1. Yes [>> Q 33] 2. No [Skip to Q 35]
33	Which season are you most likely to buy a cook stove?  (Check only one option)	1. Rainy season 2. Dry season 3. Harvest season (Months:/ Crops:
34	WHY are you more likely to buy a cookstove during this time?	

35 [ALL]	If price of the biomass cookstove, LPG stoves, Kerosene stoves and brick stoves were all free and the cost of using them were the same, which stove would you choose?	1. 2. 3. 4.	Kerosene Rejek	
36 [ALL]	Can you please tell us why you would choose that stove?	_		-

## AWARENESS ABOUT BIOMASS COOKSTOVE

No.	Questions	Response
37 [ALL] 38	Have you heard about the Kopernik Biomass cookstove? How did you hear about the biomass cookstove?	<ol> <li>Yes (&gt;&gt; Q 38)</li> <li>No (Skip to Q 39)</li> <li>I saw a community member using one in their home</li> <li>My friend owns one</li> <li>My relative owns one</li> <li>A Pekka member approached me</li> <li>Other:</li> </ol>
39 [ALL]	How many people do you know in your community that own a biomass cook stove?	0 1 2 3 4 5 6+  (IF ANY OPTION = 1 or MORE >> Q 40)
40	Have you seen the biomass cookstove being used?	1. Yes 2. No
41	Have you personally used a biomass cookstove at an acquaintance's, friend's or family member's home?	1. Yes 2. No

## INTERACTION WITH PEKKA TECHNOLOGY AGENTS

No.	Questions	Response		
4 <sup>2</sup> [ALL]	Have you ever been approached by a Pekka technology agent that sells biomass cookstoves?	1. 2.	Yes (>> Q 43) No (Skip to Q 48)	
43	What benefits did the technology agent tell you about the biomass cookstove? (Check all that apply)	1. 2. such as 3. 4. 5. cooksto 6. 7. 8. 9.	Less smoke Ability to use other types of fuel for the cook stove leaves and agricultural waste Less time required to collect firewood Positive environmental impacts She did not tell me any benefits of the biomass ove I don't remember Safety Efficiency (Long duration of fire) Other	
44	Did she demonstrate the biomass cookstove to you?	1. Yes	2. No	

## PURCHASING DECISION (if approached by a PEKKA member)

No.	Questions	Response
45	Why did you decide not to purchase the cook stove? (check all that apply)	<ol> <li>Cost of the cook stove</li> <li>I did not have enough money at that time</li> <li>The PEKKA member did not quite convince me of the benefits of this biomass cook stove over other types of stoves</li> <li>I just purchased another cook stove</li> <li>I did not like the design of the biomass cook stove</li> <li>I do not worry about excessive smoke during cooking</li> <li>I do not see how this cook stove will have long-term benefits to the environment</li> <li>Other:</li> </ol>
47	Would you have purchased the cookstove if the loan repayment plan was available to you?	1. Yes 2. No
48 [ALL]	What would you be willing to pay for the biomass cookstove?  Translators Note: Read out each option and ask the respondent whether they would be willing to buy the cookstove in that price range.  Check all that apply.	1. 0 29,999 IDR 2. 30,000 64,999 IDR 3. 65,000 - 999,999 IDR 4. 100,000 134,999 IDR 5. 135,000 169,999 IDR 6. 170,000 205,000 IDR
49 [ALL]	Are you a Pekka Member?	1. Yes 2. No

Survey End Time:

\*\*END OF SURVEY\*\*

# Survey Questionnaire Technology Agents of UB.03-1 Biomass Cookstove

#### Disclaimer

This questionnaire should be used in order to conduct one-on-one surveys with Technology Agents for UB.03-1 Biomass Cookstove. The purpose of this survey is to better understand the profile of Technology Agents who are engaged in the distribution of UB.03-1 Biomass Cookstove as well as to assess the impact on these individuals to play a role of Technology Agents.

## Background

We are students from Columbia University in New York working with Kopernik and Pekka. We are helping study their program in which they distribute UB.03-1 Biomass Cookstove in your community. All the information that we get through this survey will be used to enhance Kopernik and Pekka's UB.03-1 Biomass Cookstove program and to support your activity as a Technology Agent. We appreciate your willingness to meet with us, and will try not to take up more than 1 hour. If you wish, we will be happy to keep your identity anonymous, and we promise to keep in confidence any personal or sensitive information you share with us. Please don't hesitate to interrupt us at any time. Do you have any questions for us so far?

Date:	
Kecamatan:	
Desa:	
Dusun:	
Survey Conductor:	
Translator:	
Survey start-time:	

## **RESPONDENT INFORMATION**

1. Prefix (circle one): Mr. / Ms.

Name:Age:

No.	QUESTION	RESPONSE
4	What is your highest level of education?	
5	What is your marital status? Check only one.	<ol> <li>Married</li> <li>Single</li> <li>Divorced</li> <li>Widowed</li> <li>Do not wish to answer</li> </ol>
6	How many people live in your house? (Not including yourself)	[ ]
7	Do you earn / make money?	1. Yes 2. No
8	How do you make money, not including the commission for UB.03-1 Biomass Cookstove? Indicate all that apply.	<ol> <li>I sell snacks</li> <li>I sell small hand-made goods</li> <li>I tailor clothes</li> <li>I have my own shop</li> </ol>

			rden ( <i>kebun</i> ) ner:	
n average, how much c	lo you earn?			
ncome Generating Activities selected in Question 10	What months of the year do you do this activity?	How much do during this ti daily/weekly	me on a	Notes
		Daily: Weekly: Monthly:		
		Daily: Weekly: Monthly:		
		Daily: Weekly: Monthly:		
ow much do they earn?		•	·	·
re there any other peopow much do they earn?  Who brings in to your house?		•	·	uch does s/he earn?
w much do they earn?  Who brings in to		•	How me	uch does s/he earn?
Who brings in to your house?		•	How m	uch does s/he earn?
Who brings in to your house?		•	How my (Specify	uch does s/he earn?

5. Teacher

6. I sell other small goods (ex. Chopped wood)7. I work on a farm during harvest season

Note: Let the respondent speak first then prompt by providing all options and ask explicitly.

## UNDERSTANDING OF TECHNOLOGY AND CUSTOMERS

11	What do you think are selling points of	Affordable unit price
[All]	UB.03-1 Biomass Cookstove?	2. Easy maintenance
		3. Long duration of fire (i.e., efficiency)
	We will give you examples so answer	4. Similar appearance to kerosene stoves
	Yes/No to each of them. Feel free to add	5. Easy to find fuel (i.e., better access, therefore time
	anything else you have in mind.	saving in obtaining fuel)
	, ,	6. Good for environment
	Of the ones you selected, which ONE you	7. Good for health (i.e., less smoke when cooking)
	think is the MOST important selling point of	8. Safety (no explosion)
	UB.03-1 Biomass Cookstove?	9. Durability of the stove
		10. Cost-saving for fuel
		11. Mobility of stove
		12. Other:
12 [All]	Do you own UB.03-1 Biomass stove?	1. Yes (>> #13) 2. No (>> #14)
13	Do you use your UB.03-1 Biomass stove?	1. Yes 2. No (Why:
		)
14	Why do you not own any UB.03-1 Biomass	<ol> <li>I do not need any additional stove.</li> </ol>
	Cookstove?	2. I need additional stove but the unit price of UB.03-
		1 Biomass Cookstove is expensive.
	Note: Do not read the options. Let the	3. I need additional stove but it takes more time to
	respondent speak and circle all that apply.	cook on UB.03-1 Biomass Cookstove than on
		existing stoves.
		4. I need additional stove but UB.03-1 Biomass
		Cookstove is not easy to maintain.
		5. I need additional stove but the cost of maintenance
		for UB.03-1 Biomass Cookstove is not affordable.
		6. Other:
1		

## TRACK RECORD OF ACTIVITIES AS TECHNOLOGY AGENT

15 [All]	How long have you been a Tech Agent?	[ ] months / days (*Specify units)
16 [All]	How did you first hear about the opportunity of becoming a Tech Agent?	<ol> <li>From Ibu Reni</li> <li>From other Tech Agent</li> <li>From other Pekka members who are not Tech Agents</li> <li>Other:</li> </ol>
17 [All]	How did you become a Tech Agent?	1. Appointed by Ibu Reni 2. Appointed by someone other than Ibu Reni*  *Who: 3. Other Tech Agent* recommended to Pekka** that I should become a Tech Agent  *Tech Agent's name:  **Pekka member whom the Tech Agent made referral to:  4. I approached to Pekka and volunteered to become a Tech Agent

		5. Other:
18	Why did you decide to become a Tech	1. Money
[All]	Agent?	<ol><li>Getting to know more people</li></ol>
	We will give you some examples so indicate	(Clarify:)
	all that apply.	3. Stepping up the role at Pekka
	Note: Read all options.	4. More respect (Clarify:)
	-	5. New business skills
	Of the ones you selected, which ONE was	6. Better communication skills
	MOST important for you?	7. I do not know
	, , ,	8. Other:
19	What are the actual benefits and/or	1. Money
[All]	advantages for you of being a Tech Agent?	<ol><li>Getting to know more people</li></ol>
	We will give you some examples so indicate	(Clarify:)
	all that apply.	3. Stepping up the role at Pekka
	Note: Read all options.	4. More respect (Clarify:)
		<ol><li>New business skills</li></ol>
	Of the ones you selected, which ONE has	6. Better communication skills
	been the BIGGEST benefit for you so far?	7. I find no particular advantage/benefit
	,	8. Other:
20	What are disadvantages, challenges or	I find no particular disadvantages, challenges or
[All]	disappointment you are actually	disappointment
	experiencing by being a Tech Agent?	2. Time commitment
		3. Related expense. Specify:
	We will give you some examples so indicate	J , ,
	all that apply.	4. Not really getting to know more people
	Note: Read all options.	5. Not really changing my status at Pekka
	, and the second	6. Not really making money
	Of the ones you selected, which ONE has	7. Not really gaining new skills
	been the BIGGEST problem for you so far?	8. Not really gaining respect
	seem the Bredest problem for you so ful.	(Clarify:)
		9. Other:
21	Did you attend the formal training offered by	1. Yes (>> <u>SKIP</u> #22-23)
[All]	the technology provider?	2. No (>> #22)
22	Were you trained by another Tech Agent on	1. Yes (>> #23)
	how to sell the stove?	2. No (>> <u>SKIP</u> #23)
23	Did the Tech Agent who trained you attend	1. Yes
	the formal training offered by the technology	2. No
	provider?	3. I do not know
24	Do you have a previous experience in selling	1. Yes (Specify:)
[All]	goods through socializations and/or door-to-	(>>#27)
	door?	2. No (>> #25)
25	Are you comfortable with selling the	1. Comfortable (>> <u>SKIP</u> #26)
	cookstove?	<ol><li>Uncomfortable (&gt;&gt; #26)</li></ol>
		3. Neither (>> <u>SKIP</u> #26)
26	Why are you uncomfortable with selling the	[Free Answer]

	cookstove?	
<sup>27</sup> [All]	How many UB.03-1 Biomass Cookstove have you sold so far?	[ ] units of cookstove
28 [All]	Do you offer the 3-month payment plan (installments) to your customers?	1. Yes (>> # 29) 2. No (>> <u>SKIP</u> #29)
29	Of the cookstoves you have sold, how many of them have been paid for with installments?	[ ] units of cookstove
30	You said you do not offer installments. Why do you not offer the installments to your customers?  Note: Do not read the options. Let the respondent speak and circle all that apply.	<ol> <li>Did not know about installments until today</li> <li>Do not trust customers</li> <li>None of the customers have ever asked me about the 3-month payment plan.</li> <li>I do not want to make efforts to collect money from customers over 3 months</li> <li>Customers do not want installments</li> <li>My customers are not Pekka members</li> <li>Other:</li> </ol>
31 [All]	In which months of the year do you dedicate the most amount of time to socialize UB.03-1 Biomass Cookstove?  Circle all that apply.	1 2 3 4 5 6 7 8 9 10 11 12
32 [All]	What method do you use to sell the cookstoves? We will give you some examples so indicate all that apply. Note: Read all options Of the ones you selected, which ONE do you use most?	<ol> <li>Group socialization you set up yourself</li> <li>Regular existing meetings</li> <li>Door-to-door sales</li> <li>Other:</li> </ol>
33 [All]	When you sell the cookstoves, through which network do you reach your customers?  Choose all that apply. Note: Read all options	<ol> <li>Through Pekka network</li> <li>Through personal contacts outside of Pekka</li> <li>Other:</li> </ol>
34 [All]	Do you target specific types of stove users/owners?	1. Yes (>> # 35) 2. No (>> <u>SKIP</u> # 35)
35	What type of stove users/owners do you target specifically? Choose all that apply.  Note: Read all options	<ol> <li>Users of brick stoves</li> <li>Users of kerosene stoves</li> <li>Users of LPG stoves distributed by the government</li> <li>People who have not received an LPG stove from the government</li> <li>People with one or more stoves</li> <li>People who have never owned a stove</li> <li>People who use stoves for cooking at home</li> <li>People who use stoves for business</li> <li>Other:</li> </ol>

## IMPACT ON TECHNOLOGY AGENT'S LIFE

36 [All]	Have you taken the commission from all of your sales?	1. 2. 3.	Yes, all of the Not all but so Never (>> #3	ome (Specify:	) (>> #37)	
37	How did you use that commission?	2. P <b>#4</b> 0	o) Other (Specify: _	ÿ:		
38	You said you have <u>never</u> taken the commission. Why?	[Free Answer]				
39	What do you plan to spend your commission on when you receive it?	1. Saving 2. Purchase (Specify:				
40 [All]	Is there any difference between your personal incomes before and after you started selling stoves?	Positive difference     Negative difference (Clarify:)     No difference				
41- 44 [All]	time for? What about activities that you have less time for?					
	#41 Household chores		1. More time	2. Less time	3. No difference	
	#42 Income generating activities (other than selling biomass stoves)		1. More time	2. Less time	3. No difference	
	#43 Free time		1. More time	2. Less time	3. No difference	
	#44 Other:		1. More time	2. Less time	3. No difference	
				1	I	
45 [All]	Have you gained any skills since you became a Tech Agent?		> #46) > END OF THE	SURVEY)		
46	What kind of skills do you think you gained?	[Free answer]				

## Survey end-time:

\*\* End of the Survey Questionnaire \*\*

## AGENTS OF TECHNOLOGY, AGENTS OF CHANGE

N INDONESIA



## NAZAVA WATER FILTER REPORT

**APRIL 2012** 



School of International and Public Affairs

Workshop in Development Practice

Cissie Lam | Katie McFarland | Aastha Mehta | Twisha Mehta | Shivali Naik | Junko Tashiro



## INTRODUCTION

Similar to the UB.03-1 biomass cookstove, Pekka representatives identified the Nazava water filter as a locally appropriate technology that addressed local community needs at a Kopernik technology fair. Kopernik, in partnership with Pekka, uses the "Agents of Technology, Agents of Change" model to distribute this technology. The initial scope of work for SIPA included a rapid impact assessment on the Nazava water filter since its distribution began in September 2011. A parallel process evaluation and impact assessment on the water filter was outlined in the scoping phase of the project in December 2011. This supplemental section reports the findings from the study on the initial impacts of the Nazava water filter.

## **CONTEXT**

MDG 7 is to reduce by half the proportion of people without sustainable access to safe drinking water. As shown in the chart below, in order to achieve MDG 7, Indonesia needs to provide roughly fifty million people with improved water supply.

Indicator	Baseline (1993)	CURRENT (2009)	MDGs (Target 2015)
PROPORTION OF HOUSEHOLDS WITH SUSTAINABLE ACCESS TO AN IMPROVED WATER SOURCE	37-7%	47.7 %	68.8 %
URBAN	50.5%	49.8%	75.2 %
Rural	31.6%	45.7%	65.8 %

**Source**: Ministry of National Development Planning and National Development Planning Agency, Indonesia. (2010). Report on the Achievement of the Millennium Development Goals Indonesia 2010. 109.

Although the access to improved drinking water has increased for Indonesia overall, this increase has primarily been in the urban areas. As of 2009, in Nusa Tenggara Barat province, 44.9% of the population has access to an improved drinking water source, with the rural population rates lower than those in the urban areas.<sup>1</sup>

Access to clean drinking water is a major challenge in rural communities of Lombok. The Island experiences water shortages due to a long dry season and poor water management. Sanitation is also poor and existing water supply systems are not well maintained. This results in high incidences of waterborne diseases, and in some cases, even death.<sup>2</sup> A study by the Ministry of Health in 2008 cited that while bacteria in water caused common infectious diseases, "many of Indonesia's sources of water also contained unacceptably high levels of toxic chemicals that could lead to more serious illnesses such as cancer and anemia."<sup>3</sup> According to data from the district's social welfare office, water shortages are among the top issues facing Central Lombok. These shortages are particularly pronounced in the *kecamatans* of Jonggat, Janapria, Praya Timur, Praya Barat, Praya Barat Daya and Pujut. These kecamatans are declared as drought areas by provincial authorities.<sup>4</sup>



## **ABOUT THE NAZAVA WATER FILTER**

The water filter is composed of two 13.5 food grade plastic water containers joined by a ceramic water filter candle in the middle. The filter candle contains an activated carbon that absorbs chemicals and odors. One filter candle can produce 7,000 liters of sterile water, which is equivalent to approximately three years of drinking water for an average household.<sup>5</sup> This technology is designed to save time and fuel associated with boiling water as well as to raise awareness about clean drinking water.

### NAZAVA WATER FILTER TECHNICAL SPECIFICATIONS

Safe drinking water and a smart design at a very affordable price. This water filter has two water containers and one ceramic water filter candle in the middle. Gravity pushes the water through the filter. The containers are made of food grade plastic that does not leave taste or odor to the water.

The water filter can be provided with one, two or three filter candles. Depending on the need and the amount of water that needs to be filtered per day more candles could be used. The ceramic candle is made by Basic Water Needs in India and is highly effective in stopping bacteria. The filter candle core contains activated carbon that absorbs harmful chemicals and odors.

Tests show that one candle can deliver 7000 liter of sterile water, which equals three years of drinking water for an average household.

Capacity of water containers: 13.5 liters

Filter speed: 2 liter per hour Pore size: 0.4 micron.

Unit Price: \$14.00

Source: http://kopernik.info/en-us/technology/water-filter



The January SIPA team primarily gathered preliminary data from open-ended questions that would subsequently guide the more-structured data gathering process in March. However, initial findings revealed that only about 30 water filters had been sold. The team noticed substantial barriers that prevented the distribution of the water filters as discussed in the Findings section.

As a result, the scope of work regarding the water filter was massively scaled down for the fieldwork in March. Barriers to distribution made it difficult to track down sufficient end-users to accurately capture the impact of the water filter. Below are the questions that were asked in the survey in order to capture the profiles of water filter users.

## NAZAVA WATER FILTER END-USER SURVEY QUESTIONS

		•	
1.	$\mathbf{P}$	ref	'IV
<b>_</b> .			1/

- 2. First Name:
- 3. Family Name:
- 4. Age:

NO.	QUESTION	RESPONSE
5	What is your highest level of education?	
6 [ALL]	What is your marital status? (Check only ONE)	<ol> <li>Single</li> <li>Married</li> <li>Widowed</li> <li>Divorced</li> <li>Do not wish to answer</li> </ol>
7 [ALL]	How many people live in your house? (Not including yourself)	
8 [ALL]	Do you earn/make money?	1. Yes 2. No
9 [ALL]	How do you make money, not including the commission for UB.03-1 Biomass Cookstove? Choose all that apply.  Note: All options should be read.	<ol> <li>I sell snacks</li> <li>I sell small hand-made goods</li> <li>I tailor clothes</li> <li>I have my own shop</li> <li>Teacher</li> <li>I sell other small goods (ex. Chopped wood)</li> <li>I work on a farm during harvest season</li> <li>My family owns land which I farm on</li> <li>Other:</li> </ol>

10	On a	verage, how	much	do you earn?				
[ALL]	Ind Ge Ch sel	ome nerating oices ected in lestion 10	Wha	t months of rear do you nis activity?	Wha	t do you earn during this on a daily/weekly basis?	Add	ditional Notes
	1.				Daily: Weekly: Monthly:			
	2.				Daily: Weekly: Monthly:			
	3.				Daily: Weekly: Monthly:			
11 [ALL]	If so Yes					oney into your house? se money, and how much the	y earr	n?
		Income ear HH membe (not includi you)	r	How do the make mone		How much do they earn?		Units (specify) [i.e., Daily/weekly]
		EXAMPLE		Farmer Ojek driver		30K during harvest season ( months/year) 40K (1 or 2 days/week)	(5	Daily Daily
		#1						
		#2						
12. What	is you	ur current sc	ource	of water? Na	ame a	ll that you use:		
	Privat Privat Comn Spring	nunal tap e tap in hou e well nunal well g st rain wate						

13.	Before owning the filter, how long did 'gathering' drinking water usually take you?
14.	Before owning the filter, how much money per week/month did you spend on drinking water?
15.	Before owning the filter, did you do anything to your water before drinking it?  a. If so, what:
16.	If so, how long did that treatment usually take you from start to finish? 5 min, 10 min, 20 min, 30 min or longer
17.	Why did you choose to buy Nazava water filter? Check all that apply  It saves money  It saves energy  It is very useful  Easy to use  Health and environmental reasons  The price is low  Recommended by others  Most of people chose to buy it  Other (specify)
18.	When do you usually fill up the water filter?
19.	Can you give us any feedback on your experience using the filter?



### **IMPACT FINDINGS**

The individual interviews conducted in January included non-users of water filters to provide a context of where households obtain their primary source of water. Only three water filter users were surveyed in January and five were surveyed in March regarding the potential impact of the water filter. Therefore, the data from both the January and March trips have been combined. The impact data is based on data from eight end-users.

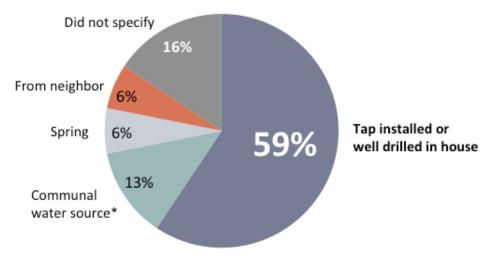
### PRIMARY SOURCE OF WATER IN THE TARGET COMMUNITIES

Of the total 32 respondents (8 users and 24 non-users of the Nazava water filter), 59% of them cited a tap installed or a well drilled in the house as their primary water source. The data presented below is from the January and March fieldwork combined.



## Primary water source in the target communities

N = 32; Water filter users & non-users/January & March participants combined

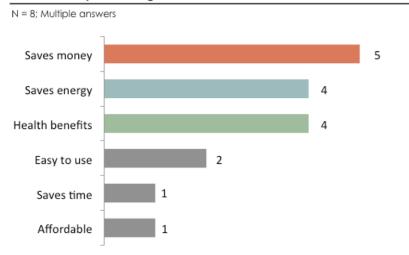


<sup>\*</sup> Well or pipe system

#### **REASONS FOR PURCHASING THE WATER FILTER**

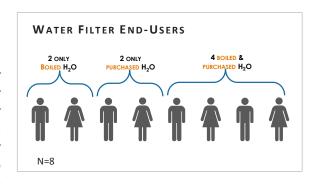
Users were asked to identify reasons for purchasing the water filter: the top reason cited was cost saving.

### Reasons for purchasing water filters



#### **POTENTIAL COST SAVINGS**

Savings came not only from purchasing drinking water but also from purchasing fuels, such as kerosene and firewood, in order to boil the water. One end-user claimed she spent about 15,000 Rp per month on kerosene and firewood just for boiling water. Another respondent said she still buys water but only 1 or 2 cylinders per month (compared to 8 cylinders prior to purchasing the water filter). Because the



survey did not disaggregate fuel costs based on boiling water only and cooking only, the amount of potential savings from the purchase of a water filter from fuel expenditures could not be accurately ascertained.

With such measurement challenges, one way to estimate the potential cost savings would be to examine the monthly expenditure on purchasing drinking water before end-users' adoption of



the water filters. Of the eight users surveyed, six respondents had previously purchased drinking water as illustrated above. The six respondents were asked the average amount of money their household used to spend on purchasing drinking water on a monthly basis prior to the purchase of the water filter. The monthly expenditures ranged from 5,000 Rp to 50,000 Rp per household. On average, these six households would save about 29,000 Rp per month by switching completely from purchasing drinking water to using the water filter.

## POTENTIAL TIME SAVED IN BOILING WATER

It was difficult to calculate the potential time saved from boiling water as a method to obtain drinking water. There were both inaccuracies and inconsistencies in the length of times that were being reported. Users and non-users of the water filter reported that it takes between five and 30 minutes to boil water. This could amount to substantial time saved if people switch from boiling water to the use of the water filter.

#### POSITIVE EXTERNALITIES

It was not possible to capture the health impact of the water filter on end-users. Because all eight end-users used to boil or purchase their drinking water prior to purchasing the water filter, the health benefits as a result of the water filter may be minimal. However, Technology Agents reported that they have sold water filters to mosques and schools, where they are used by a large number of people. Therefore, the potential for health, time and cost savings from the water filter placed in institutions is exponential.

#### PRODUCT FEEDBACK

Below is the list of comments and feedback on the Nazava water filter collected from the users during the fieldwork in January and March:

- "There is no difference in taste between filtered water and purchased water"
- "It takes an entire night for the water to filter through" (\*This may not be problematic but may require some planning)
- "The water is not clear there is white dust in filter"
- "The materials doesn't seem sturdy make the cylinder with better quality"

## **BARRIERS TO DISTRIBUTION**

### 1. LACK OF AWARENESS OF THE WATER FILTER

Many of the Technology Agents said that they had not yet performed socializations regarding the Nazava filter. Among the reasons were their lack of time and the fact that they were discouraged by unsuccessful attempts at selling the water filter. They cited that compared to the Biomass cookstove, the water filter was a harder product to sell. As a result, they eventually stopped promoting the water filter. Many participants of the focus groups with non-users as

"This area is a spring water area so the water is clean"

well as users of the biomass stove were not aware of the water filter. The low sales of water filters in comparison to the sales of the biomass stove, therefore, may partially stem from the lack of awareness or proper marketing channels.

## 2. LACK OF AWARENESS OF CLEAN DRINKING WATER

In many focus groups and interviews, it was apparent that many women were not aware of the potential risks of drinking water directly from the source. This awareness or knowledge may be *dusun*- or *desa*-specific since focus groups conducted with respondents from the same areas

"We've boiled our water since we were children. If we drink it without boiling it, we'd get a stomachache." tend to have similar responses. In some focus groups, there was a perception that drinking water straight from the source was standard procedure and the respondents had no knowledge of techniques used to treat the water to make it suitable for drinking. This was coupled with the fact that some of the people we spoke with perceived the water to be clean already and therefore felt that it was not necessary to treat the water in any way. In other groups, some women relayed that they had attended government workshops on healthy water, or their community had been affected by contaminated water and therefore they purchased their drinking water or knew to boil it prior to drinking it. Lastly, some women did not prioritize "healthy" water in their every day lives. There were a lot of other tasks that took precedence, with some women mentioning that they only boiled water when they had the time.

### 3. PRICE MAY BE TOO HIGH

The price of the water filter was mentioned as a primary reason for Technology Agents not promoting the product as well as a barrier for consumers. One water filter user commented that

"I want a water filter but I can't afford it. I want it because my husband always wants me to boil the water and I don't have time."

it may be too expensive for farmers to buy. There was also a lack of knowledge about installment plans for this product. Many consumers had no idea that this payment scheme was possible because Technology Agents were not actively publicizing the information.

These difficulties in distribution resulted in very few water filters sold; therefore, it was not feasible to capture a sufficient sample size in order to conduct a proper rapid impact assessment on the water filters. However, some preliminary data was gathered in January and March to provide some initial insights into the impact on water filter users namely, 1) reasons for purchasing the water filter and 2) cost savings.

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