The Sun Oven System
Grupo Jaragua and El Fuego del Sol in the Dominican Republic (DR) and Haiti
Solar Cooking Introduction and Adoption Process - December 2009
Written by Kevin Adair

The Sun Oven construction, donation and adoption program addresses the most crucial problem in the Western DR and Haiti right now: How can the poorest populations cook their food without destroying the dwindling tree population? This program is the first to implement a tested, scalable program that works within the existing community structure to address this most basic local issue. Furthermore, built within the program is the process to continue to measure results and improve future implementation as the program expands. Additionally, limited financial resources are considered as well because the program is designed to be financed from many sources, including funds raised within the program, international NGO support, and large developmental grant applications.

Dominicans and Haitians need convenient sustainable methods to cook their food that do not destroy the fragile frontier environment or contribute to climate change / global warming. The technology introduced for this purpose must be tested and proven effective, durable and reliable for the cooking of local traditional cuisine. Initial resistance to change in traditional cooking behaviors and flavors must be anticipated with community based mechanisms in place to address this resistance in advance of its appearance. The program should include recipient feedback, flexibility in implementation, allowance for differences in Haitian / Dominican cuisine and the possibility of multiple sustainable methods being gradually introduced that may collectively replace current methods with 100% sustainable methods.

Stakeholders include Grupo Jaragua (GJ) and associate company, El Fuego del Sol (ES), local Dominican and Haitian recipients, product construction factory workers, factory managers and community center volunteers. Additional stakeholders include local school children who will have access to a multi-disciplinary based solar cooking curriculum, school children worldwide who will be able to follow the program on the related website, ecotourists who will have the opportunity to visit and participate in the program, local NGOs who can help distribute the Sun Ovens, international NGOs that can help generate funds for the future of the project, and international volunteers and donors who will be able to sustainably support the ongoing nature of the program.

Great care and planning are required in the introduction of new cooking technologies to communities in order to reduce the ecological, economic and adverse health impact that traditional cooking methods have on populations in developing countries. According to Appropedia, the Sustainability Wiki, the most difficult problem to overcome when introducing solar cooking to new populations is “Cultural resistance; people have used wood to cook since the inception of the domestic fire. Acceptance of so radical a change as cooking with solar energy can only happen where there is real need. With ever-increasing desertification on one hand and population increases on the other, the need is growing rapidly.” Dr. William Lankford, retired physics professor of George Mason University states, “The solar oven is a technology that can be accepted if one introduces

and promotes it intensively."

Grupo Jaragua and El Fuego del Sol have performed their initial evaluative solar cooker release and are now embarking on a dramatic expansion of their program. This document outlines the process for the expansion of the program including technology choices, adoption and implementation methods, follow-up procedures, and long-term monitoring.

Initial Technology Choices.
Kevin Adair of ES did an available technology evaluation in 2005 and decided on the Global Sun Oven from Sun Ovens International (www.sunoven.com) as the first solar cooker to be introduced in the program. ES was then contacted by Ernst Rupp of GJ who cooperated in the initial evaluative solar cooker release in 2007 – 2009. ES and GJ have been pleased with the results with the Sun Oven and have agreed to proceed with this technology. Concurrently, www.solarcooker-at-cantinawest.com/best_solar_oven.html has reached the same conclusion regarding the Global Sun Oven. This independent website evaluation found the Sun Oven:

- The highest quality of all of the solar ovens in regards to materials used in its manufacture.
- The hottest solar oven, on average, of all of the major manufactured brands
- The higher overall temps make it especially good for baking cookies, breads, cakes, pies etc.
- The lid (door) is made of tempered glass and is easy to see through and keep clean; and it rarely gets scratches.
- The insulation of the GSO is excellent, allowing for higher cooking temperatures and greater heat retention during the cooking process; and afterwards when maintaining food hot or warm for several hours before eating.
- The carrying handle and the reflector panel securing strap, making the oven like a suitcase which can easily be transported and securely stored.
- The oven is light enough for anyone to carry about with ease.
- The thermometer is attached to the oven, keeping it from always tipping over or losing it.
- One of the easiest ovens to clean. Its interior has a more durable coating or finish that makes clean up easy. It is also more scratch resistant.
- The inner compartment is the deepest of the commercial solar cookers which makes it nice for cooking large hams or medium sized turkeys when the leveling tray is removed.

The Sun Oven attribute list also includes overall durability – being able to withstand being knocked over without harming the unit, and the ability to accommodate a wide variety of cookware, should the accompanying pots be lost or damaged.

The Introduction and Adoption Process
Once the best possible technology is identified, project attention can turn to the best method of introduction and adoption. GJ has an existing infrastructure of community centers and local associated community organization partners in the region where the Dominican Southwest meets the Haitian Southeast. The populations on both sides of the

border in this geographic area are some of the most impoverished and underserved in the Western Hemisphere. All of Haiti is catastrophically impoverished and this area of the DR sees very little benefit from tourism income in the country since it is the most remote.

Within this existing structure GJ has programmed in community building, natural resource management, endangered species support, reforestation, agro-forestry, and care for designated ecological reserves for over 10 years. Starting with a community base is important. The best way to overcome the initial cultural resistance is to introduce the new cooking system through an existing community network structure. Existing leaders of the community should be identified and enlisted for the initial training sessions. Since most cooking in developing countries is performed by women, choosing strong women for the initial training sessions is crucial. Access to the technology is also important and entrepreneurial efforts should be encouraged.

The example in the introduction of the first Sun Ovens in this program occurred through the GJ community center in Oviedo, DR. The community leader, Olga, was selected and given the title of head solar chef since she was already running a successful cake bakery before the Sun Ovens were introduced. She was trained in solar cooking by the GJ staff and encouraged to experiment with various cooking techniques. The Sun Ovens were first put into use in the community center cooking food for the volunteers and visitors. Olga led the new Sun Oven cooking process and trained others in the correct techniques. In exchange for her work in the program, Olga was granted cooking time in the Sun Ovens in the afternoons, after the community meals had already been produced. Olga provided the ingredients for baking cakes in the Sun Ovens, and then was able to keep all the profits from selling the cakes that she made. Through additional hours of work for GJ Olga was granted her own Sun Oven to keep.

Personal investment is key. Many efforts to introduce solar cooking have failed due to a combination of poor technology and to the solar cookers being supplied for free without the recipients being properly trained or feeling invested in the process. In creating this program various methods and metrics are being developed in order to customize the program for various recipient populations and situations.

Costs vs. Risks

The research archives at www.solarcooking.org and www.she-inc.org have several case studies and research overviews of successful solar cooking programs with lower-cost, slower-cooking varieties of solar cookers. However, the initial GJ/ES introductions demonstrated that the recipients' adjustments to Sun Oven cooking involved proper training and follow-up to achieve the adoption. Thus, any technology that did not function as well or reach cooking temperature as quickly as the Sun Oven directly reduces the chances that introduction and adoption programs will be successful with Dominican and Haitian populations.

So, how does the Dominican / Haitian experience differ from those documented at the other solar cooking sites? The answer is in the level of personal risk and the amount of control in the recipients' environments. Other solar cooking efforts have been shown

extremely effective in areas such as refugee camps where every stick of wood that is burned must be gathered outside the camp, putting women and children in physical danger. In this circumstance recipients care very little that the other solar cookers take long periods to cook. They have their entire day to safely solar cook if they don't need to leave the camp to search for wood.

Contrastingly, the Dominican and Haitian populations generally live in their own homes and do not face nearly as dramatic a physical risk while they are gathering wood for fuel. In less physically risky environments, which is a major portion of the developing world, convenience, including speed of cooking, is a dramatic factor in likelihood of long-term acceptance. The populations assisted by GJ range from desperately poor in Haiti to working poor in the DR. This diversity may be best served with a variety of programming options.

Monetizing the System

For populations that are paying money on a regular basis for wood, charcoal, propane or a combination of cooking fuels, the process of baseline fuel purchase monitoring is possible. A monetary value can be placed on the Sun Oven, possibly 5400.00 Dominican Pesos (US $150). Then if people keep a month-long log of the amount of wood and propane they buy, along with what they spent on it, 900 Pesos (US$25) can be discounted from the purchase price. A payment plan can then be established wherein the recipients pay less weekly for the Sun Oven than the amount they are saving by using it. If they continue to monitor fuel purchase along with Sun Oven use in a journal for the first month of having the Sun Oven, and make their prescribed payment, then, turning in the completed journal can be worth another 900 Pesos off the amount owed for the Sun Oven. Journaling for more time can bring in bigger discounts. Volunteer hours spent at the center doing any activity from cooking in the Sun Oven to planting trees, to reading to children can also provide credit toward Sun Oven ownership. When all ownership requirements are complete, the community center can also offer a letter certifying that the recipient has completed his or her financial commitment for the product. In time, such letters may gain credence with local banks and lenders that this individual has a history of paying his or her financial obligations.

Volunteer Hour Credits

For more impoverished populations where wood is scrounged rather than purchased and/or propane is purchased only on rare occasions, the process of demonstrating to recipients what money is saved by using the Sun Oven becomes more difficult. However, in these populations the access to cooking ability anytime the sun is shining is, in itself a strong incentive, once initial skepticism can be surpassed. For this population, a clear number of volunteer hours for the NGO must be established and clear records must be kept, so that participants can know where they are in the process toward owning their own Sun Oven. Volunteer activities can include reforestation efforts, community building, literacy training, and other activities that the center provides. The volunteer process must also include a minimum amount of hours spent actually cooking in the Sun Ovens that are used to feed those at the community center itself. It is highly recommended that the staff of each community center establish that when there is

sufficient sun, then cooking must be exclusively performed in the Sun Ovens. The incentive here is conserving the center's limited financial resources, but also to make the solar cooking process the norm for the center's feeding program.

Family Involvement to Circumvent Cultural Resistance

Once the required number of volunteer hours has been established in order for a family to acquire their own Sun Oven, multiple family members can work to accumulate those hours. It is highly recommended that the men in the family also participate to a certain extent in the volunteer hours, because men in the family have been shown to be the most difficult to convince that solar cooking is actually an improvement for their family. The best efforts of the women in a family can be thwarted by the man of the house complaining that the food tastes different than traditional cooking methods. The fact is that solar cooking *does* taste different from the smoked flavor of charcoal cooking. This difference should be introduced to all family members early in the process. In families where the husband is working full time, his participation in the program can be difficult to achieve. One potential solution is regular 'Family Days' at the community center on Sundays. For these days food will be provided by the center to entice the entire family of program participants to come. That food will, of course, be cooked in the Sun Oven if at all possible. Such events can give the husbands in the family frequent exposure to the new style of sun-cooked food, time to receive information regarding how the Sun Oven can save the family money and time (time that can allow the food preparers to do additional income-earning activities including handicrafts while the food is sun-cooking), and the option of providing a few convenient hours of volunteer work to the center. Can the father take a turn reading to community kids during children's hour? Can the father serve as umpire to a family baseball game that is part of the day? Is there a specific task that can benefit the center that the assembled group of men can perform for the center during the time that the food is cooking? These are examples of volunteer hours that can be credited toward Sun Oven ownership that men can perform to feel involved.

Community Support

The more Sun Ovens in use in a community, the more traditional cooking behaviors and tastes can loose their exclusive hold on that community. In practicality, not every husband will be willing to participate or support the program. There will always be negative voices, male and female, who are specifically adverse to any change being introduced to the way things have always been done. The antidote to this problem is the individuals in the community who are convinced of the program's benefits. Staff of the community center should hold a weekly chat session among participants to hear the stories of those who are working toward the program's success. One staff role can be to maintain a growing list of people in the community who are willing to talk to those who are holding out against the program. Having fathers available to talk with other fathers, senior citizens who can talk to other seniors, and solar cooking trainers who can learn to teach others to train in solar cooking techniques are a few examples of peer-based community programs that form the building effect of a virtuous circle of benefit for all.

Behavioral Change

Cooking in the Sun Oven *is* different than cooking over fire. One of the key differences is

the necessity to reduce the food preparer's tendency to want to stir the food. Solar cooking is all about heat gathering and heat retention. When the door of the Sun Oven is closed, the food is heated evenly on all sides by gradually warming air. When foods are properly prepared there is no need to stir foods such as rice, stewed beans, soups or meats during the entire cooking process. When food is cooked over a fire, the pot is only hot on the bottom. The heat source is so hot that the food will burn on one side and be raw on the other if it is not stirred. Burning wood can reach 800 degrees Fahrenheit (427 C). Food cooks at 180 degrees Fahrenheit (82 C). Food does not burn until it reaches at least 450 degrees Fahrenheit (232 C), and the Sun Oven is designed to consistently stay at or below that temperature. This characteristic of Sun Oven cooking requires a change in the way people think about cooking. The critical question we hear every time we introduce the technology is, "How long does it take to cook the food?" The overall reputation of solar cooking is that it takes an impossibly long time. This again is why any reasonable attempt at introduction and adoption must use the best technology available. The change in thinking involves at what point conceptually the process for cooking starts when traditional cooking methods are used. If the cooking process is considered to start when a person first starts looking for the wood that will be used to make the cooking fire, then the full cooking time is actually quicker with the Sun Oven than traditional methods since no wood foraging time is required for solar cooking. The other way to consider the cooking process is the amount of active time spent cooking. Since no stirring is required, the cook has more time to do other activities, including handy crafts, cleaning and childcare. This is another way to consider that solar cooking takes less time than traditional methods. It must be mentioned that these concepts need to be taught as part of the introduction program, because many future potential solar chefs are quick to criticize the new method as inferior to the methods that they already know. There are two mind-sets that need to be overcome with training and experience. One is that if people are not actively cooking by stirring the food, then they are being lazy and not being an effective hands-on cook. The other negative mindset is that people can be slow to adopt new methods that save money and time out of concern that they will seem stupid for cooking in the traditional manner if the new way is actually better. They can be sentimentally attached to the way things have always been done. All of these reactions should be anticipated and conquered through patient teaching, constant usage of the Sun Oven by the community center itself and enlisting community leaders to help deliver the message.

References for Change

The methods and model that have shown positive change in traditional cooking behaviors in the pilot project of GJ and EFdS, are similar to the processes indicated as successful in many previous technology introductions world wide. Experiences gained from the work to introduce Hybrid corn in the US in the 1930s to more recent introductions of medical technology have often shown success by utilizing similar introduction models. Details of scholarly works on these processes dating from the 1930s to the 1960s can be found at:
http://www2.alterra.wur.nl/Internet/webdocs/ilri-publicaties/bibliografieen/Bib7/Bib7.pdf

Cooking Tips

There are complete solar cookbooks available online describing cooking of nearly every possible type of food. So this section should in no way be considered exhaustive in scope.

However, there are some basic tips that can be used to achieve more success in the adoption process. Apprentice solar chefs should be encouraged to experiment with the Sun Oven to find new ways to cook and new foods to prepare. For effective cooking, air must always surround the pot that is cooking within the Sun Oven. If the leveling tray is removed to increase oven capacity, remember to place the pot on a trivet or small pebbles so that air can flow below the pot. The more air-tight the pot is within the Sun Oven, the quicker the food in the pot will cook. Any pot that can fit in the Sun Oven and allow the door to close can be used for cooking, but pots with black or glass lids allow for slightly quicker cooking. If a highly reflective lid is used, just cover the pot with a small cotton cloth to reduce heat being reflected out from the cooking area.

Rice should be prepared by allowing the water to boil in the Sun Oven first, before adding the rice. While this water is boiling (which could take a full hour even in direct Sun), the rice should be soaking in a separate pot of water. The rice can be stirred in this pot to help the rice enter the boiling water already wet. This has been shown to improve results. The cool water in which the rice is soaking can be drained off and used for other purposes. Then the dampened rice can be stirred into the water that was brought to a boil in the Sun Oven. Once the rice is in the pot, close the pot, and close the Sun Oven door. The rice does not need to be stirred again after that. Just turn the Sun Oven once every 30 minutes to keep it facing the sun. Cooking times vary depending on geographic location, season of the year, and amount of food you are cooking. However, once the length of time required is established for a similar amount of rice, this process can be repeated every day that there is sufficient sun.

Beans, soup, stew and **stew-type meat** dishes can be put directly into the Sun Oven once the ingredients are mixed. Close the pot, close the Sun Oven, and you are good to go.

To have more crispy meat, or to brown the meat before it is added to soup, the meat can be prepared on an open baking sheet, or a deep baking pan that is designed to fit into the Sun Oven. Leaving the lid off of the baking pan will result in more of a broiled meat experience, such as crispy chicken skin. On days when sufficient sun is present, after the chicken has been cooked sufficiently with the Sun Oven door closed in the standard manner, some solar chefs have had success in opening the door slightly by resting the door on its latches. This allows more moisture to escape and allows the result to be even more crispy and similar to frying. Lightly glazing chicken skin with cooking oil before browning can also add to the crispiness. The effect can be similar to deep-frying with much less oil absorbed into the meat, thus producing a much healthier main dish.

To bake cookies, bread, cakes, and deserts it is best to pre-heat the Sun Oven to the hottest temperature possible that day. Have the item to be baked ready and then put it in the Sun Oven carefully but quickly. Oven racks can be designed to cook two levels of shallow cakes or cookies at the same time.

Follow Up and Family Use Requirements

It is crucial that any system of introduction and adoption include frequent follow-up by the group introducing the Sun Ovens. In the follow-up, the percentage of Sun Ovens still

in use years after their introduction should be recorded for statistical purposes and to work to determine the best methods to ensure long-term use. Part of the adoption process could include the family signing an agreement that they will use the Sun Oven. If they stop using it, the outreach agency could request the Sun Oven returned. How this would work, or how it would be enforced is up to the individual practitioner's interpretation.

Pot Design and Construction

Many standard cooking containers can work effectively in the Sun Oven, so on days with extended sun it is certainly possible to cook food in one pot, remove it from the Sun Oven and then replace that pot with another pot. Water for washing the dishes can be heated while the family is enjoying the meal. Also, food for the evening meal can be placed in the Sun Oven immediately after the food for the noon meal is removed. However, while a wide variety of commercially available cookware works well in the Sun Oven, there is currently no pot available that is designed to specifically maximize the cooking potential of the Sun Oven design. It is also not possible to put two large traditional pots in the Sun Oven at the same time in order to cook large quantities of two foods, such as one pot of rice and a separate pot of beans. Suggestions have been made to modify the Sun Oven so that it is wider and can accommodate more pots. The engineering required for such a modification would remove one of the other advantages of the Sun Oven. For example, a larger capacity Sun Oven would be heavier and less portable than the current design. The alternative is to design a better variety of cookware specifically for the Sun Oven. The international licensing authority for Sun Ovens, which is the company Sun Oven International, has indicated that were the GJ-ES partnership to find a Dominican company able to produce the optimum cooking containers for the Sun Oven, then Sun Oven International would be able to purchase a sizable number of these specially designed cooking pots as well. This could lead to a lower overall cost per pot produced.

Local School Programming

ES has created a complete elementary school curriculum based on the lesson plan originally created by the solar-cooking experts of the Miami Country Day School. This school lesson plan is now available in English and Spanish, and it encourages experimentation of students as they learn about the process of solar cooking. The cross-discipline approach to learning in the Sun Oven Curriculum includes lessons in the genres of : Science, Creativity, Global Climate, Conservation, Nutrition, Alternative Energy, Culinary Arts, Geography, Web Skills, Comparative Cultures and Marketing. The process in the scholastic portion of the program would again be to connect with a teacher or principal of a school to spearhead the program.

Website Global Interconnectivity

A website devoted to this project will be established and linked to the GJ website, the ES website and the Solar Cooking Archive. Schools around the world will be encouraged to add their individual experiences in solar cooking to this interactive site.

Outreach to Other NGOs in the Region

NGOs operating in Haiti and the DR will be encouraged to obtain Sun Ovens from the GJ program. These Sun Ovens will either be supplied at a discount or full donation to

qualifying groups who agree to perform the required training and follow-up of the GJ distribution model and agree to report the results back to GJ. Hundreds of organizations operate within Haiti, often at the expense of already scarce resources. Promotion of the program will encourage NGOs to participate and reduce the overall ecological impact of their own programming. The program model and the metrics developed regarding measuring ease of product adoption and likelihood of long-term use, will be replicable for ecologically minded NGOs worldwide in their efforts to reduce the ecological footprints of their programming. The program itself will also draw crucial attention to the benefits of solar cooking, and the need of the green community to make it of the highest priority, especially in outreach to developing countries. The program is cross beneficial in the sectors of: Climate Change, Environment, Protection of Forests, Health of Recipients, Community Development, Entrepreneur Opportunities, Dominican / Haitian connection, increasing regional visibility, education, international internet interconnectivity, beneficial tourism and Women and Children benefiting primarily.

Dominican Renewable Energy Product

The Sun Oven has been tested by the Dominican National Energy Commission, has passed the testing and inspection, and was recommended for acceptance in the program. The result of this certification would mean that Sun Ovens would never require taxes to be paid on the product again, whether it was sold by a for-profit company or an NGO. However, there is now a costly application process for full certification that needs to be paid in order to achieve the tax-exempt status from that point forward. It is hoped that international support for this program will assist in raising funds to complete the certification process.

International Fair Trade Standards

The factory to produce the Sun Ovens will follow all established Fair Trade standards. JG and ES look forward to working with the various international Fair Trade evaluation organizations to develop and achieve every variety of Dominican Fair Trade Manufacturing status for the Sun Oven.

Introduction of Additional Products

Once this process is introduced and successful it is the intention of GJ and ES to test additional solar cooking devices to see how they might fit into the program as well. Other renewable technology products will also be introduced including organic pellet producers to allow for renewable cooking when the sun is not present, and wood gasification stoves to dramatically increase the amount of cooking time generated from each piece of wood (or organic pellet) that is used in cooking when the sun is not present.

Ecotourism Participation

International visitors have participated in this program and have found it extremely meaningful, important and fulfilling. Visit: www.youtube.com/watch?v=oy02Hjb5Ows El Fuego del Sol hosts ecotourists from around the world for programs including exploring Fair Trade Cocoa, and the EcoTourism and Development Fair in March 2010. Information about current voyages is available at www.elfuegodelsol.com. Ecotourists that visit ES anywhere on the island are encouraged to donate funds to the Sun Oven

donation program in conjunction with GJ.

International NGO Support Network

To encourage international donations to support this program, ES and GJ are seeking to create a network of NGOs in many countries around the world. This would allow for international fundraising to support this program and for individual donors from various countries to receive tax credit. The increasing number of NGOs internationally would also potentially allow for visiting ecotourists to receive tax benefit in their home country when they make a donation of a Sun Oven during their visit to the Dominican Republic.
To allow the greatest potential expansion of the program, all NGOs that are currently operating in the DR and/or Haiti are encouraged to contact the program's sponsors to explore collaboration opportunities. Millions of programming dollars are spent every year by developmental organizations. The activities of outreach organizations currently have the unintended consequence of putting additional strain on local fuel resources. One visit of international volunteers can deplete months of fuel resources from a local community eager to please visitors to the impoverished region. ES and GJ strongly encourage all developmental organizations to include tested solar cooking solutions in their programming budget. All socially beneficial activities should work toward reducing the carbon footprint created by their own programming, and cause the least stress possible on the local ecosystem. Aid workers using Sun Ovens themselves and requiring solar cooking whenever possible for their organization's food preparation staff increases local exposure to successful solar cooking on a daily basis, while simultaneously providing training to local food preparers to the unique skills, flavors and benefits of solar cooking.

The Hybrid Association

Grupo Jaragua has programmed in: community building, natural resource management, endangered species support, reforestation, agro-forestry, and care for designated ecological reserves for over 20 years. The renewable cooking program continues that strong history and will continue to draw further attention to all of the GJ causes.

El Fuego del Sol is the Ecotourism division of Adair Performance SRL-DR. Adair Performance SRL is a Dominican triple-bottom-line limited liability corporation. Triple-bottom-line companies are designed to be financially sustainably self-sufficient while strong attention is also paid to improving the social and ecological environment. The association between these two entities is what is becoming known as a Hybrid business model where non-profit companies form working agreements with for-profit companies.

GJ and ES have worked together on the pilot for this program since 2007. ES initiated the Sun Oven program in the DR in 2005 after evaluating solar cookers available on the market. The Sun Oven proved to be the best over a wide variety of factors, and ES started working with Dominican NGOs to distribute Sun Ovens that were built in the DR and paid for by donations from US citizens. The GJ community based distribution program proved successful and worthy of expansion. Since the Sun Oven program is specifically designed to be beneficial to impoverished populations, operating it directly by GJ is the best possibility for long-term success. ES will remain active working with GJ in the program's continued development.

The association between El Fuego del Sol and Grupo Jaragua introduces many

operational advantages. The two organizations share a dedication to improving ecological and social aspects of the Dominican Republic and Haiti. The work in promotion, production, distribution, donation and evaluation of Sun Oven brand solar cookers and other renewable cooking methods is one of the first efforts ever to develop a predictable, replicable and success-based adoption method. Additionally, the entire process will be documented in writing and video to demonstrate the levels of success, and continually work to improve the program in the future. Both organizations share the open source philosophy that encourages input from all interested parties for the long-term benefit of the program. Potential donors, visitors, volunteers, experts in the field, and interested NGOs are all welcome to contact the principals in order to participate in the program.

Contingency Planning

The lasting value of any development program can come down to how well the program can withstand any foreseeable circumstance. Key questions and their responses in the specific case of this project include:

What if funding is cut or not renewed?

The tragic circumstance of the Haitian people and the similar related effects on the Dominican Republic have inspired billions of dollars to be spent with the hope of improving the situations. Millions of trees have been planted in Haiti. Tens of thousands of volunteers have worked countless hours. The top industry in Haiti is receiving international aid, as compared to the DR where the top three industries are tourism, agriculture and manufacturing. The concentration of aid activities in Haiti make it difficult for non-aid supported projects to thrive. Large and small scale initiatives, such as millions of trees planted over several decades in Haiti, have resulted in few long-term measurable results. Once a tree is burned for that day's fuel, if there is no funding to replace the tree, there is no lasting benefit to the program. Contrastingly, once a Sun Oven is introduced and long-term adoption is achieved, it continues to be of value for decades to come.

What if pieces of your technology are lost or dropped?

The Sun Oven is a durable piece of technology that the staff of El Fuego del Sol has been actively using on a frequent basis for almost 5 years. The units in use have been transported around the island, and are still fully functional. Minor issues have emerged such as one internal thermometer failing after several years of use, however that cooker itself is still fully functional. In the course of their travels, the Sun Ovens have withstood several accidental tumbles, including the units rolling out of vehicles onto the ground with no detectable damage at all. The reflectors have become scratched through use, but it has not impaired cooking times. Contrastingly, other solar cookers considered for programming only function if all of the original pieces are kept together. Lose or break any part of other solar cookers, and that other variety of solar cooker may not function.

Does your technology encourage innovation by program participants?

In the Grupo Jaragua community center in Oviedo, DR, volunteers procured several additional cooking containers that fit within the Sun Oven and expand the varieties of food that could be cooked. By using open oven pans rather than closed stew pots,

volunteers discovered that they could cook chicken that has a crispy skin, similar to fried foods. Since the chicken is not deep-fried the chicken is a more healthy food than the traditional similar food, but it still fulfills the expected eating experience of crispy-skin chicken. Such innovation would prove extremely difficult with other solar cookers that require the exclusive use of the pots provided with the cooker in order to achieve desired cooking results.

Continuing Challenges

In spite of all of its technical cooking advantages over other solar cooking technologies, staff and volunteers from GJ and EFdS have not found the adoption program to be easy. Dramatic changes in behavior are required. These changes in behavior can be difficult to initiate, so careful planning and clear follow-up should be incorporated into any solar cooking introduction effort. The introduction and adoption models described in this document are presented in open-source format with the hope that improvements can be made which will increase solar cooking's acceptance around the world. Please contact the author with any relevant information on your solar cooking introduction model and method, and please publish your process and findings at the Solar Cooking Archive Wiki: http://solarcooking.wikia.com/wiki/The_Solar_Cooking_Archive_Wiki

This document is intended to be adapted and updated as the program expands and is further implemented. The Sun Oven construction, donation and adoption program is presented in Open-Source design in accordance with all El Fuego del Sol programming. Acknowledgements for partnership and assistance are hereby made to the staff and volunteers of Grupo Jaragua and El Fuego del Sol, and specifically for the input of Ernst Rupp in the creation of this program and this document. Comments, critique and suggestions are welcome at www.elfuegodelsol.com and kevadair@aol.com.

Kevin Adair, President of Adair Performance / El Fuego del Sol earned a Double-Discipline BA with Special Departmental Honors from Illinois Wesleyan University in Theater and Cognitive Behavioral Psychology.