

## **Project Title: Maasai Mara SODIS Demonstration and Technology Transfer**

**Amount Requested (US\$):** \$3870    **Duration:** 1 year    **Start/End Dates:** Dec 03/Dec04

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Following is the report for the *Maasai Mara SODIS Demonstration and Technology Transfer* project of the Maasai American Organization. Included are:

1. summary of accomplishments by objective,
2. chronological narrative and impressions of the project, and
3. budget.

### **I. ACCOMPLISHMENTS BY OBJECTIVE**

#### **Short Term Objectives for Project Participants:**

##### **1: routinely using alum/SODIS water purification practices:**

Participants are using alum on a routine basis. Compliance was validated by site inspection and interviews and by monitoring the quantity of alum that MAO supplies to requesting parties. Alum is now a common household product. Most household members can describe it, know where it is stored, and can demonstrate the process by which water is cleared with it. Overall use has escalated to the level that the Ministry of Water is considering imposing a purchase fee similar to that paid by municipalities where water is treated at a public source.

Participants became aware of the (alleged) importance of safe water. Most began a SODIS procedure, then many switched to using *Waterguard*. The process and explanation are in the later narrative. The MAO took a neutral position and encouraged participants to use whichever procedure or procedures they found to be comfortable and effective. Assessment evidence supports the fact that safe water practices are in use, though it does not support a conclusion that all users recognize why they are important. Nor does it support a conclusion that procedures are faithfully and correctly followed on a universal basis.

## **2: effectively managing clean water to prevent recontamination;**

Not all participants have achieved this measure. Most participants regularly keep purified water covered in a clean container. The break in clean water management occurs when drinking. Dirty cups, vessels that are wet after washing in contaminated water, and vessels on which flies are resting, are used for drinking. Even the boarding primary school, the most strident advocate of safe water treatment and management, has not brought students to full compliance with recommendations for keeping utensils associated with water clean.

## **3: incorporating food-handling practices that reduce fly contamination;**

Participants darken their houses when they prepare food, thereby reducing fly activity. This practice predates the present project, but the project helped reinforce the importance thereof. Food is now covered with leaves before and during preparation to protect against flies. Milk containers are kept closed. The major shortcoming in food handling is in leaving food waste near preparation areas, thereby attracting flies to cooking and eating places and utensils.

## **4: understanding the disease reduction benefits of maintaining the regimen.**

The assessment team was not convinced that some of the participants understand that safe water practices contribute to overall health. The germ theory of disease is alien to some. School children understand the concepts associated with hygienic practices, but many of the women who are responsible for carrying out the household tasks do not. The assessment team found that some participants were conscientious in the practice because they were fulfilling a commitment that had various stakes for them. Others participate to please the MAO, recognizing that the organization continues to be instrumental in bringing water closer to their communities, a benefit that they value. The notion that dirty utensils, dirty hands, human or animal fecal matter could spread disease is not readily accepted. Of particular note is that flies are regarded as a positive element. Though women prefer to keep flies off their food, they see flies as an indicator that water is nearby and that rain will come. They are conflicted about the matter of keeping flies at bay. The common resolution is to attempt to keep flies away from food, but to allow them to settle freely on the faces of children and on food refuse that is proximate to eating and drinking areas and supplies.

### **Long Term Objectives for Project Participants:**

#### **1: building the curriculum into Pillar of Hope training;**

This objective has been accomplished. Pillar of Hope provides voluntary counseling and assistance to HIV positive clients in the greater Narok area. Clients now receive instruction and assistance in safe water management to reduce the risk of opportunistic diseases.

**2: involving the Narok County community based organization coordinator and assisting her in transferring the program to additional communities;**

The Coordinator is fully invested, is serving ex-officio on local water committees, and is assisting in organizing additional training programs for assuring safe water in the area. She is a major actor in post-training follow up from the water conference and is assisting in hosting a local conference in Siana.

**3: using positive outcome to convince the Narok County Ministry of Health Office to add the program to health education efforts;**

This objective is being negotiated. The barrier exists because the health educator assigned to the Maasai area does not speak the Maasai language. As a Swahili speaker, he can communicate directly only with those Maasai who are educated. To date, he is not working with a translator to reach Maasai speaking households. The Ministry of Health office is aware and regards this as a shortcoming.. The Siana Dispensary Committee, the community organization responsible for monitoring Ministry of Health activities in the local area, has registered a complaint and has requested that safe water practices be taught as part of the Ministry of Health service.

**4: teaching science teachers in the primary schools and assisting the schools in propagating the curriculum through school committees.**

The science teachers in all three primary schools in the area have been trained and include the curriculum in their teaching.

## **11. CHRONOLOGICAL NARRATIVE AND IMPRESSIONS**

The processes by which the objectives were approached are described below in a chronological narrative of the experience. Time units are separated to conform with visits by the US team.

### **Project Start-up**

The project began officially with a December 2003/January 2004 field visit that included two PIs, Cathy Fitzgerald and Lea Pellett; three students, and five volunteers who are professionals in health related fields. During a two week field stay:

1. The team familiarized Pillar of Hope staff with the project, educated them in the procedures that would be taught, and established an agreement for participation;
2. A chemistry instructor in the volunteer group performed a SODIS experiment for the Siana Boarding Primary School students and science teachers, contrasting the water they used with water subjected to alum/SODIS treatment. He taught them to use coliform testing procedures and laboratory

microscope observation to “see” contamination. The chemist also took samples from the water sources at the two smaller primary schools, explained the testing process, and had the science teachers and students participate in testing their water and drawing conclusions regarding the state of contamination. Finally, he held sessions to help students come to a common definition and set of qualifying symptoms for diarrhea;

3. The MAO employed Agnes Meja, a young, college educated Maasai woman as a field site manager, with the water project as her major responsibility. Dr. Hansen, a volunteer with extensive experience in educating for developing countries, spent the two weeks tutoring Ms. Meja in safe water practices and appropriate curricula for teaching those practices effectively.
4. The students, who had prepared a draft set of illustrations to accompany teaching modules on alum, SODIS, clean water protection, and diarrheal abatement, piloted the illustrations with Maasai women in the area, revised their illustrations, and produced multiple sets of posters and visuals for teaching.
5. The team trained 24 Kirimatisho women, members of the organization proposed as the initial trainers. The trainers agreed to practice in their own households for a two month period, during which they would keep data on diarrheal episodes within their own households. After that interval, they would begin training in their communities. Ms. Meja would provide on site assistance during the initial period. The team distributed buckets, bottles, aluminum sulphate chunks, and black plastic sheets for use during the pilot period. Additional materials were stock piled for wider distribution when the trainers were sufficiently confident to teach the practices in their communities. (Parenthetically, the women were incredulous when they saw the muddy water become clear after application of alum. At first they claimed that the magic would not work for them or that they could not afford the medicine we were applying. They remained skeptical about the probability of their being successful in clearing the water when they began the procedure on a routine basis.)

## **Field Trip 2**

Cathy Fitzgerald and Camilla Buchanan made the initial follow-up site visit in June, 2004. Cathy took Agnes Meja to a community outside the Maasai Mara where hygienic practices were more highly developed and gave her an opportunity to demonstrate her hygiene education skills under Cathy’s supervision. Agnes worked in the primary school and with members of the community. To further enhance her skills and MAO’s awareness of public health efforts and techniques in Kenya, Camilla Buchanan and Agnes Meja attended a several day conference on water purification and management in Nairobi. CARE Kenya offered the conference in conjunction with the United States Center for Disease Control and the Kenya Ministry of Health. Kenya was in the midst of an intensive campaign to encourage use of the chlorine product *Waterguard* that was being introduced in Kenya. Procedures for alum, SODIS, and *Waterguard*, along with

positive and negative attributes of each procedure were covered in the conference. The conference also emphasized practices for safeguarding water that has been purified, avoiding practices that recontaminate water, and methods for curbing disease transmittal by flies and waste materials.

Upon return to Siana and inspection of the communities where the Kirimatisho women were demonstrating their techniques, Camilla Buchanan found that many of the pails had been confiscated by the men in the villages and were being used for brewing beer. The large supply of 2 liter bottles that MAO had collected for SODIS was not moving from storage. Insufficient evidence of safe water procedures being practiced was visible. Dr. Buchanan concluded that the women lacked adequate power, motivation, understanding, or combination thereof, to successfully move the project forward and that Ms. Meja needed higher credibility and more direct involvement. As a corrective action, Dr. Buchanan recommended that the water conference that was to be held in Narok, per proposal, be expanded to include more community stake holders in positions of authority and responsibility. She also recommended that the CARE staff who had presented the conference in Nairobi be invited to conduct the conference in Narok.

### **Field Trip Three**

Lea Pellett and three additional volunteers; a former East African Peace Corps volunteer currently a graduate student in community development, and two undergraduate anthropology students, spent three weeks in July, 2004 in Siana, working with the project. They assessed progress and problems, recruited a new set of community trainers, and did comprehensive planning for the regional water conference.

Included in their findings of progress and problems regarding were:

1. Among the Kirimatisho women, some were diligently following the procedures and introducing the practices in their communities. Most were not.
2. Two of the three primary schools were working with the water curriculum but favored using *Waterguard* to using SODIS because they found it faster and less likely to result in loss of bottles or confusion about which containers of water were purified. They were ready to begin treating the school water in order to get the children accustomed to the bleach taste that most of the respondents found unsatisfactory. Availability of *Waterguard* was limited and sporadic.
3. In a taste test conducted on a pilot group of women, over 80% concluded that the men in their household would not tolerate the taste of *Waterguard*.
4. Buckets used for alum treatment were often stolen or taken by household members who outranked the women responsible for providing water. Women did not report the loss nor did they try to replace the buckets. Instead, they reverted to the traditional practice of fetching water in a 20 liter jerry can and leaving the water in the can for direct use. Exacerbating the container problem was the low number of jerry cans that an individual woman owned. Most had two or three maximum, filling them in the morning and evening and using the water directly and without settling time. They complained that even if they could afford more

- cans, had storage space for more cans, and had the leisure to make more trips to the water source, the water would be consumed as soon as it was available and there would still not be time for debris to precipitate out. Considering the very small amount of water available per person day and the cultural expectation that women will provide whatever water is used, this complaint was expected.
5. SODIS bottles were frequently switched or confused, resulting in water that had not yet been sanitized being substituted for safe water. Some errors were made by the women themselves. At other times, the switches resulted from children handling the water or from other members of the community using and/or replacing water. As was true for the pails, SODIS bottles disappeared or reappeared with different contents on a regular basis.
  6. Some women objected to the introduction of alum in water that would be used for washing dishes or clothes because it hardened the water and increased the amount of soap required. Some also objected to the feel of the hardened water on their skin. Though it is possible to soften the water, a technique had not been introduced as part of the training procedure.
  7. More intensive supervision by the field manager was required.

To escalate the pace of the project prior to the planned water conference, the field team provided the schools with appropriate storage containers and a start-up supply of *Waterguard* and insured that a local merchant became a *Waterguard* supplier in the area. The schools initiated a project in dispensing only safe water for student consumption and in educating the students to the understanding that the peculiar taste was not a sign of contaminated water.

To increase the size and quality of local participants who were using and demonstrating safe water practices, MAO announced the availability of tuition money for thirty children whose mothers would act as participant demonstrators of safe water practices. The team recruited thirty women who wanted their children to go to boarding school, but were struggling to raise tuition money. They were willing to substitute water training for the work they were doing to raise educational money. The children and their mothers were trained and given the materials with which to maintain water procedures. For the initial two months, each mother was asked to identify a sentinel, pre-school age child in her household and to monitor that child's health as a base line for determining frequency of diarrhea. After the two months, she was to begin the safe water procedures, and continue to report episodes of diarrhea.

The team also made detailed arrangements for a day and one-half regional water conference to be held in August in Narok, the county seat. The plan was for fifty participants to be trained as trainers. The CARE Kenya staff that conducted the conference in Nairobi was recruited to assist in the training. Administrators and practitioners from the Ministries of Health, Water, Education, Social Services and Community Development, teachers, non-governmental organization workers, community based organization leaders, religious workers, parents, and politicians were invited. The goal was to generate a sufficiently dense critical mass of informed and committed activists to make safe water practices a high agenda item.

## **Water Conference**

The PI's for the project were not in Kenya for the water conference, but did have representation through two MAO board members from Kenya. All 50 invitees attended the evening and full day sessions. Evaluation forms showed positive reception by the attendees. Pillar of Hope attended to follow-up training for the participants who were county level employees.

## **Field Trip Four**

Lea Pellett returned in December 2004/January 2005 with a team of thirteen volunteers, including four students and nine health related professionals. The team conducted intensive assessment and instruction. The community of each of the thirty women whose children were being sponsored and each of the Kirimatisho women who were actively engaged in the water project was visited at least once. The trainers modeled their procedures, displayed their household system, had team members accompany them from the water source through the entire procedure, and answered questions. Community members were surveyed to learn their reaction and the degree to which they had been "converted" to safe water practices.

The impressions were mixed. Compliance with the protocol was high, but accuracy in performing the procedures and in maintaining cleanliness of instruments was variable. The most frequent concern was that the evidence of diarrheal continuance and/or abatement was not trustworthy. Women were not always aware of the status of a particular child's health, did not consistently regard a condition as a measure of illness, or did not correctly follow the procedure for reporting illness. (Each woman had been supplied with a circular key ring that held a fixed number of paper hole reinforcers. Each day on which a child had more than three bowel movements that were of a consistency or color that matched pictures she had been given, she was to tear one of the reinforcers from the ring. The site coordinator was to keep records based on the number of reinforcers taken from the ring during a specific period.)

Adding to skepticism of the assessment team was the concern that women were distorting information to insure that they received approval from the MAO. For example, one of the communities in the project received spring protection and piping of clean water to convenient locations at about the time the MAO project began. All drinking water in that community was therefore potable. The MAO did not remove the community from the project because the need to learn to care for safe water properly continued. However, when women in the community were asked to report on diarrhea in their children, including the sentinel child, they reported that their children had diarrhea until they began putting *Waterguard* in the drinking water, at which time the problem ended. Some of the women were properly caring for their clean water; others were not. Yet, all reported that the significant improvement in health coincided with the onset of *Waterguard* treatment.

In another incident, a mother reported that she was following all of the recommended procedures, but her toddler still had persistent diarrhea. Upon inspection, the team noted that the child was playing in cow dung that was mixing with her stool. The child then drank water from a dirty cup that was next to the container in which water was stored. Though the water container had a faucet near the bottom, ( per recommendation by the MAO) the faucet was difficult to manipulate and the child instead opened the container at the top and dipped her hand and the cup into the water vessel. The mother, who did not observe the incident, assured us that all of her children followed the clean water procedure so diarrhea must not be related.

To reinforce what the community members are learning, the team worked with the school committees for the primary schools, providing training in water procedures and sharing their concerns about gaps in the efficacy of the project. Members of the school committees, voluntary committees of parents and community leaders, comparable to PTA's in the US., agreed to work with the trainers in each community, providing support, credibility, and a forum for discussion of the process.

The concluding impression of the field team was that community members are aware of water treatment. Some are carefully following procedures; others are not. The data collected were too tenuous to subject to numeric analysis. Though a substantial body of quantitative data was generated, the reliability of the data did not warrant further manipulation.

The final recommendation of the team was that the site manager continue with aggressive outreach into the communities and that she organize a follow-up conference at the Siana Primary Boarding School for local participants. The MAO will continue to promote safe water practices and will continue to monitor performance.

### **Field Trip Five**

Lea Pellett returned to Siana in February and March of 2005, after the official termination of the SCJF project but within the ongoing activity of the MAO. During that field visit, the water committee for three communities, Kipapa, Osinoni, and Megwerra, requested that a training program be held in their region for all the women in the communities. The request is being carried out with a half-day training program in the Maasai language and with sufficient individual trainers, equipment, and materials to provide small-group, hands-on experience for each household that attends. The water committee is eager to establish universal use of water protection practices as a gate way to requesting federal money for water upgrading projects. The conference they request will be provided during the last week of March, 2005.