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Monitoring and Evaluating Malawi Youth Conservation Engagement after Community-Based Environmental Education Workshops

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Project Statement

This project addressed Peace Corps Malawi's need to redevelop and implement environmental education workshops using a community-based approach, monitored project outcomes from these workshops, and provided an evaluation of strengths and areas for improvement of the environmental education workshop program.

Background

Country History

Malawi is a small landlocked country in Southern Africa that is 90 km wide, 250 km long and has a total area of 118,480 km² (FAO, 2016). The topography is very diverse across the country with highlands, valley plains, a large plateau area, and an escarpment. Malawi's climate is tropical continental, with two distinct seasons: the dry season from May to October, and the rainy season from November to April, with a mean annual rainfall of 1,180 mm (FAO, 2016).

Malawi is one of the world's least developed countries, with a largely agricultural-based economy, high population growth, and an economy dependent on international donors. The country is heavily dependent on rain-fed agriculture with 80% of the economically active population working in the agriculture sector and a very large proportion of Malawi's population operating small-scale farms to meet family food consumption needs (CIA, 2017). An El Niño-driven drought in 2015 and 2016 led to widespread food insecurity and slowed economic growth (CIA, 2017). The growing population of Malawi increases a higher need for food production and puts further pressure on the country's natural resources. The population growth rate is an estimated 3.30% and is ranked the fifth highest in the world with 66% of Malawians under the age of 24 (CIA, 2017). Forest resources have a recent history of overexploitation due to population growth.

Between 1972 and 1992 Malawi's forest resources were reduced to half its previous size with an annual deforestation rate of 2.8%. From 1990 to 2000 the deforestation rate was reduced to 2.4 %, although this rate is still higher than the Pan-African average (FAO, 2010). Most of the pressure on forest resources is from population growth, poverty, economic activities and conversion of land for agricultural use (Mauambeta et al., 2010). These complex anthropogenic causes mean that environmental projects need to take into account both broader context socioeconomic factors as well as ecological factors.

Depending on the region, the anthropogenic pressures vary along with differences in livelihoods and ecology. In some areas of Malawi, the main threat to Malawi's forests is timber harvesting to create the drying racks used in commercial fishing (Abbot & Homewood, 1999). Other areas of the country are heavily impacted by land conversion for farming tobacco as a cash crop. Fire is often used in this process to clear forests and fields and results in a loss of carbon, soil nutrients, and biodiversity (Davies et al, 2010). However, not all uses of forest resources in Malawi have been shown to be environmentally destructive. Abbot and Homewood showed in their case study that domestic use of firewood appeared to be persisting at sustainable levels (1999).

Identifying local knowledge and local perceptions of threats to land degradation demonstrates the complexity that behavioral changes need to address. A study done in northern Malawi found that all households interviewed were aware of the increased erosion around their village and most believed this was a result of deforestation (Davies et al, 2010). While many also connected erosion to yearly fires set by villagers, the idea of changing fire use was seen as unrealistic in the community's eyes. Tree planting was instead seen as a preferred solution. This case shows the importance of understanding community perceptions, needs and preferences.

My Experience as an U.S. Peace Corps Volunteer

I served as a Peace Corps volunteer in Malawi from 2015–2017 in the environmental sector. The US Peace Corps was founded in 1961 as a volunteer program run by the United States government. It was authorized by Congress with the passage of the Peace Corps Act, which states the program's purpose: “To promote world peace and friendship through a Peace Corps, which shall make available to interested countries and areas men and women of the United States qualified for service abroad and willing to serve, under conditions of hardship if necessary, to help the peoples of such countries and areas in meeting their needs for trained manpower” (Pub.L. 87–293). All of my actions during those two years were under this vision to assist Malawians meet their needs.

Malawi’s Peace Corps program began in 1963 and currently has over one hundred volunteers working across the country at the grassroots level in health, education and environmental sectors. I served as a Natural Resource Management Extension Volunteer in a rural village in the country’s southern region and initiated projects with community members related to environmental conservation, education as well as health education.

I initially completed a nine-week, in-country training program that included language, environmental and cross-cultural education. Technical training focused on participatory extension methodology, permaculture principles, low-input sustainable farming practices, and agroforestry. All trainings emphasized communication in the local language, and at the end of my service I obtained a level of Intermediate High on the American Council on Teaching Foreign Language (ACTFL) scale. During this intensive community-based training, I lived and interacted successfully with my Malawian host family, as well as with community members.

After successfully completing training, I was posted to Ntumba Village, adjacent to Liwonde Forest Reserve, to work with local community groups and extension staff in the

Forestry Department. I lived and worked within the village alongside community members. My house was a typical village house made from mud bricks and a tin roof, with no electricity or running water. My daily life was similar to community members' and I mostly communicated in the regional language. I attended funerals, church and village ceremonies, played soccer with school children, assisted my neighbors harvesting their crops, and danced in celebration with my local villagers. This allowed me to be more integrated with the local Malawian culture and establish trust with community members and was crucial in enabling me to accomplish anything during my service.

During my two years of service, I worked with government staff and local groups to reduce non-sustainable use of community natural resources in protected areas and improve the management of these resources. I established five demonstration school gardens utilizing permaculture techniques, conducted improved cookstove trainings to teach community members about the environmental benefits of their use, and led various environmental education programs with students. In addition to these primary projects, I also implemented a health education program with primary school students about HIV/AIDS and malaria, coordinated a girls club focused on gender equality, and assisted with a short-term school feeding program. My time as a Peace Corps Volunteer gave me a wide variety of work and experiences living at the local level alongside Malawians.

Peace Corps Malawi Environmental Education Programing

A large portion of my work was focused on addressing the needs of Malawians and improving the use and management of natural resources through the lens of Environmental Education (EE). The Belgrade Charter laid out the modern framework of global environmental education: "Environmental education is a process of developing a world population that is aware of and concerned about the total environment and its associated

problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones” (UNESCO 1976). Peace Corps Malawi volunteers often incorporate the principles of environmental education into many environmental projects.

In 2015, a group of Peace Corps volunteers created the inaugural Sustainable Environmental Education for Development (SEED) workshop. SEED replaced a previous 2009 to 2014 week-long annual youth camp that had focused on environmental and community health awareness. These previous camps had minimal documentation about what was taught, and little monitoring of what was implemented by participants during or after the camps. With the creation of SEED, programs addressing environmental education by Peace Corps volunteers was heavily revamped and reimagined to focus more heavily on preparing young adult participants to implement mitigation activities specific to environmental challenges across Malawi. The principles of EE were highly stressed in the project development process to ultimately empower individuals at the local level. The goals for SEED placed additional emphasis on documentation and monitoring of the program implementations and outcomes.

One challenge of integrating the best practices of EE while creating the SEED program in Malawi is that the majority of research on EE has been done in the western context with limited case studies in the developing world. Many countries in Africa have a long history of EE that is now starting to be evaluated including that of Guyana (Comber, 2016), Tanzania (Johnson and Johnson-Pynn, 2007; Westfall, 2014), Uganda (Johnson-Pynn & Johnson, 2010), and Kenya (McDuff, 2000; Mwangangi, 2012). In Malawi Glasson et al. (2006) investigated the potential to incorporate place-based education and ecological sustainability into earth science pedagogy in a two-year case study at a teacher training college. The authors found that within the traditional school structure place-based

education had the potential to “promote community involvement, authentic learning, and ownership of the educational process” (Glasson et al., 2006). As Peace Corps volunteers, we attempted to adapt the current EE techniques with our knowledge of local culture and customs while creating our programs.

SEED Workshops were designed to engage Malawian youth in learning about environmental issues affecting their communities and to empower them with culturally appropriate solutions using local resources. The first SEED occurred in 2015 and was a national level environmental workshop hosting 25 Malawi youth. This workshop brought together youth from all across the country for a weeklong training located at Liwonde National Park. The week included sessions designed to increase participants’ environmental knowledge and behaviors around issues such as deforestation, water conservation, and agricultural soil health. Participants were taught skills such as making compost, building improved cookstoves, tree nursery establishment, and permaculture techniques for home gardens. Aside from technical information and hands-on demonstrations, participants also formed action plans specific to their communities to implement conservation projects utilizing skills and knowledge from the workshop.

Recent scholars have pointed out the problem of a lack of evaluation of EE programs, as well as a lack of a consensus on appropriate approaches or components of an evaluation (Carleton-Hug and Hug, 2010; Stern et al., 2014). Past Peace Corps Malawi’s EE programs had not created any foundation of monitoring or evaluation. Without much guidance from the literature or past programs, the monitoring process had to be created from scratch. The underlying assumption for the SEED program is that by developing participants’ environmental awareness, knowledge, and skills, participants will engage in community action (see Appendix A). To test this assumption and to track our work we

chose to focus on participants' progress on action plans as a focal point of measuring project outcomes.

Community-Based SEED Workshops

During 2016, the SEED Workshop program transitioned from a single, national event to small community-based trainings that a single Peace Corps volunteer could implement with higher customization. The pilot year monitored four different types of community-based SEED workshops. As the Sustainability Coordinator for Peace Corps Malawi environmental education programming, my two main objectives were 1) to revise and implement environmental education workshops adapted with a community-based focus, and 2) to monitor outcomes and outputs of individual workshops. It was during this transition that I worked with Peace Corps Staff, my fellow SEED Coordinator and other volunteers to help coordinate, record, monitor and analyze the four workshops.

Objective 1:

Revise and implement environmental education workshops adapted with a community-based focus

The four workshops occurred across the country (Figure 1), and each workshop varied in the way that it was implemented. Workshops were adapted with a community-based emphasis by incorporating Participatory Analysis for Community Action tools into workshop planning (Peace Corps, 2007). Three main evaluation tools were used in this process: community mapping, pairwise ranking and seasonal calendars. The logistics and themes of the workshops were adapted for specific circumstances as found in the community assessment and planning phase. Details of each workshop can be found in Table 1, along with an example of the schedule from the first workshop (Appendix B).

Lesson plans for the 2016 sessions were derived from the 2015 SEED workshop and were adapted by volunteers to better fit the needs of their community. I worked with volunteers to modify these plans and provide guidance on topics and content, including any results from their community assessment.

Figure 1. Locations of the Four SEED Workshops during 2016

Locations of Sustainable Environmental Education for Development 2016 Community-Based Workshops

Table 1. Summarizing Community-Based Sustainable Environmental Education for Development (SEED) Workshops in 2016

Seed Workshop	Workshop Details	Topic Covered
Machinga CDDSS July 18-20	16 Secondary Students 3 Peace Corps Volunteers 1 School 4 days 7.5 hours each day Day Only	Improved Cookstoves Tree Nursery Establishment Environmental Issues Teach Backs Action Planning
Karonga August 15-19	23 Secondary Students 3 Peace Corps Volunteers 8 Schools Combined 5 days 8 hours each day Overnight Workshop	Improved Cookstoves Food Security Issues Permaculture Skills Tree Nursery Establishment HIV and the Environment Gender and the Environment Nutrition Teach Backs Action Planning
Hope House Orphan Care August 22-26	23 Hope House Beneficiaries 3 Peace Corps Volunteers 4 Days 8.5 hours each day Day Only	Improved Cookstoves Food Security Permaculture Skills Nutrition Teach Backs Action Planning
Puteya CDSS October 8,15,22, & 29th (Saturdays)	30 Secondary Students 4 Peace Corps Volunteers 1 School 4 days 7.5 hours each day Day Only	Improved Cookstoves Food Security Environmental Issues Nutrition Community Mapping Food Preservation Alternative Fuels Teach Backs Action Planning

Workshop Planning to Incorporate Community Assessment Tools

During the year of 2016, individual Peace Corps volunteers selected community partners and participants for each workshop. Three of the workshops were conducted in partnership with schools and planned with Wildlife Clubs. These after-school clubs focused their activities on environmental issues. Many of the volunteers had preexisting

relationships with the club's teachers and students before planning the workshop. Selection of participants was done with the help of school teachers. The Karonga workshop included an application process where students wrote essays about environmental issues and their life goals. One workshop was coordinated with an orphanage as the community partner and the participants were all youth beneficiaries at the orphanage selected by staff members.

Before the workshop volunteers and community partners planned the logistics such as location, time, food, resources and topics to be taught. These discussions were held during the months leading up to the workshop with volunteers meeting with teachers, staff members and interested participants. During these meetings, participants' interest in environmental topics was discussed, alongside logistical and budgetary concerns. Along with these meetings, Peace Corps volunteers also completed a community assessment with their participants that helped to inform workshop planning. Community assessment tools used included community mapping, seasonal calendars, and pairwise ranking.

Community mapping is a development tool that asks participants to create maps of their community. Participants are asked to include what is important to their community and often include locations of drinking water, rivers, schools, roads, agricultural fields, homes, erosion, and anything else of importance to them. The volunteer did not direct the mapping process but rather attempted to let the community show what resources and locations are valued. For SEED workshops, volunteers created these maps with students and teachers before the workshop or on the first day. These maps were then used to discuss community assets and needs and allowed the workshop to incorporate environmental resources and community issues from the students' perspective. The themes that were found relating to the communities' environmental conditions were integrated into lesson plans and workshop topics. For example, a map may include a nearby forest reserve and in

the discussion the volunteer may learn that this is the main source of firewood for the community and that firewood is becoming more scarce close to the village. In the SEED workshop the volunteer could refer to this example when introducing improved cookstoves or planting trees.

Another assessment tool that was used is pairwise ranking, which identifies environmental issues communities consider as most important. This ranking was done by asking the group of participants to list out all environmental issues their community was facing. Next, those environmental issues were put in a grid and the group voted on each issue to determine which was the most important to address. In each grid space, votes were taken between the two issues associated with the row and column. After all of the issues had been voted on, the votes were counted and the one that had the highest tally was the issue considered most important to the community. This tool was used in the SEED planning process to decide each workshop's focus. An example of the results of the grid voting is shown below as a pairwise ranking.

Figure 2. An example of the vote results from pairwise ranking the environmental issues in a community

Environmental Issue:	Deforestation	Erosion	Soil Health	Crop Diversity	Water Scarcity	<u>Tally</u>
Deforestation	X	Erosion	Soil Health	Deforestation	Deforestation	2
Erosion	X	X	Erosion	Erosion	Erosion	4
Soil Health	X	X	X	Crop Diversity	Soil Health	1
Crop Diversity	X	X	X	X	Water Scarcity	1
Water Scarcity	X	X	X	X	X	1

In this example, erosion was found to be the most important issue, as it received the most votes. A workshop in this community would include erosion as a central topic and try to incorporate in the lesson plans any information that was discovered during group discussions about soil erosion in the community. These discussions could shed light on why community members view this issue as such a large problem, the factors that are causing soil erosion, as well as potential solutions to the problem.

The last community assessment tool commonly used was seasonal calendars. To create a seasonal calendar for their village participants went through each month of the year and listing the month's common activities. Participants were prompted to think about timing of specific events by asking them when people are working the fields, when are school terms, when are rain/hot seasons, when is water scarce, etc. These seasonal calendars were used to better understand a community's needs, resource use, and free time. While planning SEED workshops, volunteers used information from the calendars to understand the best time of the year to orchestrate the workshops by understanding what resources would be available during the time of year. The Putaya SEED workshop included a seasonal food calendar in its training to include a community-level understanding of when food is scarce during the year and introduced the concept of food preservation.

Figure 3. Example of a seasonal calendar showing community activities, weather, health and other events by month

Figure 4. Example of a food availability seasonal calendar showing which types of food are available throughout the year from Putaya SEED workshop

Implementation of Workshops

Volunteers utilized community assessments in the creation of individual schedules, plans and logistics for their workshops. When I developed and implemented the SEED workshop at Machinga CDSS, I combined participants' input, the project budget, and logistical considerations to create an overall project plan. The Machinga CDSS workshop took place at the local secondary school and hosted students during the day. Meals were provided, as well as some basic materials for classroom activities and hands-on demonstrations. The specifics of each workshop varied, but all volunteers managed their workshop, facilitated sessions and oversaw their budgets. While some logistics and subjects differed at each workshop, all workshops included: Improved Cookstoves, Teach-Backs, and Action Planning, while three of the four workshops included: Environmental Issues in Malawi and Food Security.

Environmental Issues in Malawi

One session focused on environmental challenges connecting large-scale issues like deforestation to other environmental and social problems. Hands-on activities involving soil erosion, water scarcity, pollution, and population growth were used as demonstrations. Students had a general understanding of these topics since the subjects are taught as part of the standard Malawian school curriculum, but this session worked to give students a place-based education about these subjects. Examples were pulled from their local communities whenever possible. Hands-on demonstrations were done for kinesthetic learning, and the local language was often incorporated. The session culminated in the participants listing effects of environmental issues in Malawi and their root causes.

Improved Cookstoves

Improved cookstoves were taught at every workshop because of Malawi's reliance on firewood for cooking. To address environmental issues around deforestation, improved

cookstoves were introduced as a tool to decrease household firewood use. Students learned the benefits of improved cookstoves, how to construct them, as well as their maintenance issues. At every workshop, an improved cookstove was built out of local materials with a demonstration of how to use the stove. The lesson plan for this session can be seen in Appendix C.

Permaculture Skills and Food Security

Permaculture was taught as a way of addressing food insecurity. Basic permaculture skills were adapted to a Malawian context and focused on retaining soil moisture year-round, planting to improve household nutrition, and increasing soil health. Most workshops created gardens with students.

Teach Backs

All workshops gave participants the opportunity to practice teaching and presenting to each other on topics they had learned during the week. The lesson started by giving students information on best practices for presenting and educating others. Then they were given time to develop basic lesson plans and scripts. Lastly, every participant led a teach-back to the group on a topic of their choice. This lesson allowed participants to apply skills they had learned from SEED.

Actions Plans

At the end of each workshop, each participant or group worked to create a basic action plan to apply a skill they had learned during the week. The action plan included a goal such as teaching community members about improved cookstoves. They then created a project plan to implement. Each step of the plan contained a task, the participant responsible for its completion, any necessary materials, and a timeline. An example of a participant's action plan can be seen in Figure 5.

Figure 5. An action plan completed by a participant at Hope House SEED workshop. This action plan focuses on the goal of building improved cookstoves in the community.

ACTION PLANNING—Exercise 3

You have completed the hard part in exercise 2. Next, it is time to take all of your ideas and, and put them in a table of steps and tasks.

Step: First, second, third step needed to work towards your goal. An action plan may take more or less steps depending on the project.

Task: WHAT do you need to do?

Who: WHO does this? Do you need to do this with other people?

Materials/Resources: What do you need to complete this task? Make sure you have these things collected and ready to use when you begin work on this step.

When: WHEN are you starting this task? How long will it take? When might this step be completed?

Step	Task	Who	Materials	When
1	Do a research of my community	with my friend..	Energy to walk around	In two weeks time coming
2	finding Materials	with my friend	*money to buy + Bricks + termite's soil + hoe + cow manure + water	In a week
3	Actual teaching, demonstration	with my friend	+ Lesson Plan + charts + materials mentioned above	It may take a month to complete.
4	People should retain demonstration	with my friend	- materials as above	In a month
5	Follow up	with my friend	- transportation	A week

Continue the table on more pages, if you need.

Objective 2:

Monitor outcomes and outputs of individual workshops.

The monitoring process involved collecting and summarizing information from each workshop. Peace Corps volunteers collected information from each workshop and then sent me their reports. Monitoring mainly consisted of three components: participant feedback, pretest and posttest results, and follow-ups on participant progress towards completing their action plans.

Participant Feedback

At the end of each workshop participants were asked a series of questions to provide feedback on their experience. These questions are listed in Appendix D. Questions were read aloud in English and written on a chalkboard or large flipchart. Efforts were made to translate the questions into the local language when possible. Most of the feedback was written in English, with occasional local language words used. In an attempt to receive honest feedback, participants did not write their names to keep responses anonymous. Each workshop's lead volunteer read through the participants' responses and summarized the results in their report.

The feedback showed that participants had a strong preference for hands-on and practical sessions. Theoretical sessions were not as well received. The most hands-on and interactive lesson plan involved building improved cookstoves. This session earned the most positive survey results. One possible reason that the "Environmental Issues in Malawi" session received negative feedback is that it presented more abstract and complicated subjects and it did not teach the participants any practical skills. The language barrier might have compounded the issue since it was a more theoretical lesson and was likely harder to understand.

Table 2. Participant feedback summarized by workshop

Seed Workshop	Summary of Participant Feedback
Machinga CDDSS	Participant stated that the most hands-on and practical sessions were of great importance with improved cookstoves receiving the best feedback
Karonga	Participants preferred hands-on and practical sessions but theoretical sessions were not as well received
Hope House Orphan Care	Participant favorite sessions: cookstoves and composting. The least favorite sessions were the biointensive planting and the lesson “Environmental Issues in Malawi”
Puteya CDSS	Participant feedback was not reported for this workshop

Pretest-Post Test Results

Pretest and Posttests were given to each participant at each workshop (excluding Karonga) to measure the workshop’s effectiveness at increasing student’s environmental knowledge. The questions were read aloud and written on flip chart paper in English. Facilitators attempted to explain or translate questions when misunderstandings arose. Participants answered questions on paper, in mostly English, with short answers. Students were generally given an hour to answer the questions. Throughout the year’s workshops, the questions were refined and improved in an attempt to the limit language barriers. Each test was unique to subjects taught at the individual workshop, but certain subjects such as “Improved Cookstoves” and “Environmental Issues” were taught at all three workshops so the corresponding questions were asked on all workshop tests. Test questions are listed in Appendix E.

Tests were graded by the workshop's volunteer leaders. Answer keys were written beforehand and the tests were graded utilizing the predetermined answers. Students that did not take both tests were removed from the analysis and the average test score was determined for the pretest and posttest. The change was determined by the differences between the posttest from the pretest. The workshop volunteers only reported the percentage change to me. The results from each workshop are reported in Table 3. A general trend with the test scores was an overall improvement over time. This is most likely explained by volunteers refining the test questions and language to avoid confusion

Table 3. Results of pretest and posttest score changes and the output projects from each workshop.

Seed Workshop	Average Test Score Change	Output Projects After Workshop	
		Improved Cookstoves	Additional Projects
Machinga CDDSS July 18-20	+ 11%	Built: 22 Trained: 14	<u>Tree Nurseries</u> Seedlings: 66 Planted: 24 Trained 27
Karonga August 15-19	Test not given	Built: 7 Trained: 55	<u>Tree Nurseries</u> Seedlings: 500 Planted: 50 Trained: 53
Hope House Orphan Care August 22-26	+ 16%	Built 5 Trained 0	<u>Permaculture</u> Compost Piles Built: 5
Puteya CDSS October 8,15,22, & 29th (Saturdays)	+ 49%	Built: 11 Trained: 30	<u>Food Preservation</u> Individuals making Peanut butter: 8 Individuals Drying Fruit: 2 <u>Alternative Fuels</u> Individuals making Briquettes: 14

Follow Up Monitoring

Monitoring participants' engagement after the workshop was conducted by the volunteer who led the workshop. These volunteers were located in the communities and had some relationship with the schools, individuals or the orphanage. Oftentimes they were assisting participants in completing environmental projects as a result of the workshop. Two months and four months after the workshop volunteers attempted to track down participants and record any work relating to skills taught.

Paper surveys were initially used for participants to report environmental work (see Appendix F). Issues like misunderstanding the questions, language barriers, and the participants' desire to please volunteers led to some false data. Also, printing paper surveys was not always feasible when working in low-resource areas. With these factors, the monitoring switched to a more interview-centric methodology with either groups or individuals according to what the volunteer deemed appropriate or possible.

Participants were asked if they had completed any of the activities or projects that they had learned during the workshop and if they had trained additional individuals during the process of performing these activities. They were also asked about challenges they were facing and if the volunteer could assist them in any way. Oftentimes, the volunteers already had some general knowledge of the participant's activities and challenges since they had been frequently checking in and assisting the participant with their projects. Results of the follow-up were reported to me using the Monitoring and Evaluation Form (see Appendix G).

One surprising finding of this monitoring process was the small amount of participants who reported any progress on their action plans. Zero participants reported that they completed their action plan. Oftentimes participants reported that the work they had done as a result of the workshop was not related to their action plans. For example, a

participant who made an action plan to start a community tree nursery might report that no work occurred to build the nursery and instead had built improved cookstoves. This outcome suggests that focusing monitoring on the action plans may not be the best way to capture the workshop efficacy.

Evaluation of Strengths and Areas for Improvement

The information and results from each workshop were compiled at the conclusion of the monitoring process for all four 2016 workshops. All materials were used to compose a manual for Peace Corps volunteers wanting to implement workshops. Key information used for the monitoring portion of the manual are summarized below:

1. The language barrier was an ongoing issue at every workshop. The language used in Pretest-Posttests, evaluation questions, and lesson plans needs to be stated as clearly as possible for the interpretation of individuals for whom English is a second language. There should always be an emphasis on the importance of translating and presenting material in the local language.
2. Participant feedback should be highly valued and the more theoretical sessions need to be heavily revised. Ways to minimize the language barrier within these lessons should be tested, particularly incorporating more local language and culture. Including more hands-on activities alongside these environmental theories may also be of value. “Environmental Issues in Malawi” and the “Biointensive Planting” section of permaculture lessons should be retooled and piloted in future workshops.
3. Questionable data was found in paper survey results. There were inconsistencies with the information participants reported to volunteers. Monitoring participants’ projects is more accurate if done in an informal way with a volunteer verifying the

results. Suggestions of best practices for the monitoring process can be seen in Appendix H.

4. The majority of projects completed were found at the volunteer's first official follow-up visit after the workshop. Often the volunteer would report that no additional projects had been done at the time of the second follow-up visit. The crucial time to capitalize on engagement is soon after the end of the workshop. It was suggested that an expected follow-up visit should be discussed and planned with participants during the workshop. The follow-up would ideally be done in conjunction with a project such as building a garden or planting trees to implement skills for the workshop. This would be designed to hopefully continue the workshop activities' momentum and for the volunteer to identify both progress and challenges.
5. The most significant outcomes were reported when the volunteers stayed actively involved with the group or individual implementing the projects. The majority of projects implemented by participants after the workshop were not the sole result of the SEED workshop, but also the combination of continued support from the volunteer lead to considerable impacts. It can be assumed that most Malawian youth are not equipped with skills to initiate community environmental projects and that a weeklong workshop is not sufficient on its own to empower these individuals. Peace Corps volunteers have a unique capability of being located in the community for longer periods of time than most aid organizations, the ability to sustain long-term interactions with Peace Corps Volunteers should be used in addition to the SEED workshop.
6. Monitoring participants' progress on their action plan may not be the best indicator for success of the workshop. Monitoring and evaluating any work related to skills

learned in the workshop seems to be a better indicator in measuring the effectiveness of engaging participants in creating community environmental actions. The action plans may still be a useful teaching tool, but the volunteer should frequently work with participants after the workshop to discover why these plans are not being implemented.

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Appendix A. SEED Logic Model

Situation	Inputs	Outputs		Outcomes		
	What we invest	Actives: What we provide	Participation: Who we reach	Short Term: Learning	Medium Term: Action	Long Term: Impact
<ul style="list-style-type: none"> Degrading environmental conditions in Malawi that needs to be protected and improved School Wildlife clubs with desire, but no time or resources, to implement environmental conservation projects Youth that need knowledge of environmental science, and hands on skills to address environmental issues 	<ul style="list-style-type: none"> Peace Corps Volunteers' time Low input resources <ul style="list-style-type: none"> Basic materials Educational Materials Community resources Potential for Grant funding 	<ul style="list-style-type: none"> Pre-workshop: Participatory evaluation with participants and stakeholders 4-7 day long workshops Post-workshop: follow up of participants that may be accompanied by work project 	<ul style="list-style-type: none"> Students in Standard 8 – Form 4 (Ages 12-20) Educators Community Partners 	Students and Teachers <ul style="list-style-type: none"> Increase awareness of local environmental issues Understand the impacts that humans can have on the environment Participants lead a session and teach their group about an environmental issue or skill Participants create action plans for how to start environmental protects in their community 	<ul style="list-style-type: none"> Participants use their action plans to execute projects in their communities Participants go on to teach other students and community members School wildlife club use environmental community projects as a teaching method 	<ul style="list-style-type: none"> Improved community environmental conditions Increased capacity in community to address environmental issues

Program Stakeholders:

Students, Teachers and other Community Partners, Parents of participants, Peace Corps Malawi, community members

Assumptions in Program Administration:

- Teacher or community partners can assist the Peace Corps Volunteer in the development, implementation and follow up of workshops
- Quality of environmental education with fewer participants is more important than desirable than maximizing number of participants reached

Assumptions in Program Theory:

- Awareness, knowledge and skill development will lead to community environmental action
- Programing adapted to the local community is more effective than generalized environmental education curriculum

Goals:

- Goal 1: Students will gain knowledge on environmental stewardship and awareness through hands on activities and technical trainings in a village focused context.
- Goal 2: Students will gain the skills necessary to create and implement sustainable community development projects in their home communities.

Appendix B. Schedule of First Community-Based Workshop

Time	Monday July 18 th 2016	Tuesday July 19 th 2016	Wednesday July 20 th 2016	Thursday July 21 st 2016
8:00-8:30	Opening Remarks, Orientation to SEED, Icebreakers, Expectations	Improved Cookstoves	Tree Nursery Work	Guest Speaker
8:30-9:00				All Things Connected
9:00:-9:30				
9:30-10:00				
10:00-10:30	Pre-Test	Break	Break	Post Test
10:30-11:00				
11:00-11:30	Environmental Issues in Malawi	Build Cookstove	Tree Nursery session	Action Plan
11:30-12:00				
12:00-12:30	Lunch	Lunch	Lunch	Lunch
12:30- 1:00				
1:00- 1:30	Environmental Issues in Malawi	Action Plan Session	Environmental Ed/ Teach backs	Action Plan Presentations
1:30-2:00				Graduation & Talent Show
2:00-2:30				
2:30- 3:00				

Appendix C. Improved Cookstoves Lesson Plan

Objective- Participants will: <ul style="list-style-type: none">• Be able to understand the tangible benefits of using an improved cook stove, and will have the knowledge and materials to begin building them in their home communities.	
Time: 3 hours	
Materials: <ul style="list-style-type: none">• Panga knife• Mud Mortar (Termite soil, sand and manure)• 10L bucket of water• 15 or 30 standard size bricks• Flipcharts/maize sacks• Axe head or other small/strong digging tool• Hoe	
Handouts: <ul style="list-style-type: none">• TLC Rocket Stove or Ripple Africa Chungu Chungu Moto handout	
Pre-Posttest Questions: <ol style="list-style-type: none">1) List three benefits of building and cooking on an improved cook stove.2) What is the next step after a cookstove has dried?3) In Malawi, on average how many hours per week do girls/women spend collecting fuel wood?	

Material Preparation

Mud Mortar: Mix 3 liters of termite clay, 3 liters of sand and 3 liters of manure (fresh manure only preferably cow) with 3 liters of water.

Introduction (30 minutes)

Activity: Simon Says/Making a Drama (15 minutes)

In this activity, participants will create two dramas by roleplaying the different family members and their activities within a household. The facilitators/PCVs will give each person instructions on what they should act out, much like Simon Says. The rules given to participants/actors are that they must do the command most recently given to them until they are given another, and whenever they are told to "gather firewood", they must "cut" three trees.

First, ask for four participants - 1 father, 1 mother, 1 son, 1 daughter. Make sure everyone knows which family member they are playing the part of (you can use props and costumes if you want, i.e. mother wears chitenje). One person should act as the time keeper, and keep the drama to 90 seconds. Firewood collection will happen every 30 seconds in the first drama, every 45 seconds in the second. On the chalkboard (or flipchart, drawn in the dirt, etc.) draw 24 trees, and tell participants that this is the "forest", where they will gather firewood.

Explain that in this first drama, the family has a 3-brick fire that they use for cooking. Start the drama, instruct father to go to the field (to go mold bricks, go to work, etc.), mother to go gather firewood, son and daughter to go to school (go to the field, go draw water, etc.). When mother finishes getting firewood, she should start cooking. Continue

instructing family members on what to do, using your knowledge of household duties and gender roles to keep everyone busy. At some point during the 90 seconds, mother gets sick (from smoke inhalation), and son and daughter have to step in to gather firewood and cook. After the 90 seconds are up, have a brief discussion about what happened, making sure to emphasize the points that firewood collection took a lot of mother's time, and she got sick, which then made other people have to do her work for her, so they had less time to do things that were important to them.

In the second drama, (using the same four participants or four new ones), explain that this family has built an improved cookstove. It starts the same way as the first drama, with mother going to gather firewood, then cooking when she gets back. This time, she does not get sick during the drama, and the facilitators should instruct her to "go to the village banking/IGA/SOLID group", and instruct other family members to do more recreational activities, like watching the football match, visiting friends, etc. At the end of this drama, have another discussion about what happened, drawing attention to the point that less time was spent gathering firewood, and mother didn't get sick.

Share the statistic:

Average household uses roughly 3 head loads per week, and women/girls spend about 10 hours per week collecting fuel wood.

How does this affect the household?

Information (30 minutes)

Ask participants these questions and discuss:

- What health risks are associated with cooking over a fire?
 - Smoke can cause respiratory issues such as:
 - Lung cancer
 - Pneumonia
 - Burns from the fire
- What percentage of Malawians uses fuel wood as their main source of fuel?
 - 90%
- Most of Malawi depends on fuel wood, what does this mean for Malawi forest?
 - Environmental pressure associated with over 17 million Malawians dependent on firewood for fuel
 - Rate of deforestation is 0.84%, loss of an average of 32,950 hectares of forest per year (from 1990-2010)
 - Deforestation exacerbates effects of climate change, Soil erosion increases, silting of bodies of water increases, loss of fertile soil/arable land causes people to cut down even more trees to clear land for farming
 - Population also projected to increase meaning that even more people will need fuel wood, which puts even more demand on forests

Introduce the idea of an Improved Cookstove as a way to save time and money, have a positive impact of the environment and help human health.

Environmental benefits of ICS:

- Uses less fuel wood compared to the traditional three-brick fire because the design of the cookstove makes combustion more efficient
 - Three-brick fires are less efficient because the fire is open to the air on the sides, but not the bottom. This causes heat to be lost and also prohibits complete combustion of the wood gas, this results in more wood being needed to produce the same amount of energy
- Using less firewood reduces the rate of deforestation because people do not need to harvest firewood as frequently

Health benefits of the ICS:

- Less smoke is produced, which means there is less smoke inhaled by users of the stove, less smoke inhalation means healthier respiratory systems

Practice/Application (2 Hours)

First the trainer will demonstrate the proper design of the stove using bricks only. The demonstration should talk through the whole process of building the stove including:

- Placement of the stove in the kitchen
 - The stove's combustion chamber should not be facing the doorway where it would receive a direct draft
 - Leave space behind between the wall and the stove to allow for bigger pots
- Ventilation- Importance of window in the kitchen and introduce the half kitchen idea
- Need for a strong roof to protect the stove during the rains

Invite participants to study the stove design during the process and at the completion. After they have finished studying it, dismantle the stove and pick a group of 4 volunteers to build the stove. The instructor should only correct mistakes at the end or if the participants are really struggling. After the completion of the first group, choose new participants to rebuild the stove. Decrease the size of the groups as the skill of people increases. After all participants have mastered the technique, build the stove using mud.

After building the stove talk about the next steps:

- Smear the mud as the stove dries and cracks appear
- When the stove is dry in 3-5 days, and devoid of cracks, it is ready to use
- Light a long fire after the stove is ready to burn the stove and seal it
- Remind participants of the importance of ongoing maintenance
 - Fix cracks as they appear
 - Replace pot rests if they break

Cooking Tips of using an ICS:

- It takes time to learn and adjust to the new stove, and may take a few days- plan extra time to learn
- Fuel wood should be dry and cut into small pieces
- The fire needs to be monitored and fuel wood continually needs to be pushed into the chamber to feed the fire
- Save fuel wood and decrease air pollution by placing burning pieces of wood into sand at the end of use

Trainers will discuss the next step – initiating this activity in their home communities.

Important concepts covered are:

- Make sure they feel confident and comfortable in using their stove
- Conducting group trainings - think of existing groups in the community who would want to learn
- Making sure that each stove built is also done in a way that trains the end user to build it, because an unused cookstove is just as bad as no improved cookstove
- Building *and using!* A demonstration stove at your (or other publicly-visible area, i.e. Health center, chief's house, etc.) for practice and to raise interest
- The importance of follow up visits in getting people to use the stove - once a stove is built, the user should be encouraged to break it in correctly by burning an initial long, hot fire, and should periodically be Chalk if a chalkboard is available communicated with to make Maize Sacks/Flip Charts

Appendix D. Participant Workshop Evaluation Questions

Questions were read aloud and posted in a classroom. Participants wrote responses to question anonymously

Evaluation Questions

- 1) What were your two favorite sessions and why?
- 2) What were your two least favorite sessions and why?
- 3) Were there any topics not covered that you would have liked to have learned about?
- 4) What was your favorite part of SEED?
- 5) What could have made this week better?

Appendix E. Pre-Posttest Questions and Answers

Action Planning

1. In an action plan, what are the three things every plan needs?
Tasks, Roles, Timeline
2. True or false: weather must be considered when planning a project.
True
3. Why is it important to keep records of work for a project?
Know what you have done, learn what is working and what isn't, or may be important information for other groups/NGOS in the future

Tree Nurseries

1. List two locally available resources you can use to establish a tree nursery
Grass, Tree Poles, Panga Knife, Hoes, Used Shake Shake Carton ect.
2. List the ingredients needed to make tree nursery soil.
Topsoil, Sand, and Manure or Compost

Environmental Education in Your Community

1. List at least three objectives that an environmental lesson should stress.
Knowledge, Skills, Attitudes, Awareness, Participation
2. What are to things to consider when planning an environmental lesson?
Time, Audience, Materials, Objective

Fruit Drying

1. What are the five steps of drying fruit?
(1) Prepare winnowing basket
(2) Wash fruit
(3) Peel fruit
(4) Slice fruit
(5) Put fruit in sun
2. List two reasons why fruit must be covered when it is dried.
Helps trap heat, Keeps fruit clean

Environmental Issues in Malawi

1. What is the definition of food security?
Not enough food available (physically available AND affordable) that people like to eat for any prolonged amount of time
2. What is the effect of population growth on environmental issues in Malawi?
The population is growing while natural resources are decreasing, which leads to resource scarcity
3. List four environmental issues in Malawi
Food Security, Deforestation, Climate Change, Population Growth, Water Pollution, etc.

Community Mapping

1. List two reasons to use a community map.
(1) Shows what resources are available in a community
(2) Informs where projects can/should be done in a community
(3) Shows the difference between genders and how they perceive their community
2. When we draw community maps, why are genders asked to draw maps separately?
Can clearly see what locations are important to each gender, and males and females will feel more comfortable to express themselves

Improved Cookstoves

- 1) List three benefits of building and cooking on an improved cook stove.
Save time on collecting fuel wood, save time cooking, less smoke, less deforestation...
- 2) What is the next step after a cookstove has dried?
After the stove has dried burn a long fire
- 3) In Malawi, on average how many hours per week do girls/women spend collecting fuel wood?
10 hours

Income Generating Activities

- 1) Alinafe spends K2000 on groundnuts and K500 on plastic bags. She sells 30 bags of chiponde for K100 each. Does she make a profit?
 $30 \times K100 = K3000$
 $K2000 + K500 = K2500$
 $K3000 - K2500 = K500$
Yes, she makes a profit of K500.
- 2) In a business what is an expense?
Something that must be bought in order to make a product

Climate Change

- 1) What is climate?
Weather patterns over very long amounts of time, thousands of years.
- 2) What are the effects of climate change?
Changes in wind and ocean currents, precipitation patterns, melting ice/rising sea level, warmer oceans, higher intensity weather events (hurricanes, droughts, floods, etc), expanded tropical zone, desertification

Appendix F. SEED Action Plan Evaluation

Original paper form given to participants to report projects progress one and three months after workshop

The purpose of this form is to gauge the progress of SEED Participants' Action Plan implementation. We hope to identify what is working well with your Action Plan in your community and what challenges you may be facing in implementation. Please provide as much information as possible and return this form to your PCV. Thank you.

SEED Participant Name: _____

Village/District: _____ Action Plan Area of Focus: _____

What was the goal of your action plan?

Who are you working with in implementing your Action Plan?

What have you achieved in your community since SEED Workshop relating to topics learned at SEED?

What challenges have you encountered in implementation of your Action Plan? List and describe challenges.

Do you believe you will be able to achieve the goal of your Action Plan? (circle one)

YES

NO

Provide reasons for your answer above:

When do you expect to have your action plan completed?

Is there anything specific that could help make implementation of your Action Plan/achieving of your goal more realistic?

Appendix G. SEED M&E Form

Filled out by volunteer after following up with participants

Please submit this form to the SEED Coordinators **a week after the completion of the follow-up of your workshop**. M&E follow-ups should be done 1 and 3 months after the workshop.

This information will be used to track, report and evaluate all SEED workshops. You are responsible for reporting any and all work done by participants at your site, use your own discretion for best approaches to support and monitor participants. Submit this form to SEEDtrainingMalawi@gmail.com or through Whatsapp to your SEED group chat.

SEED Location		PCV Workshop Coordinator	
Dates of Original Workshop		Date(s) of follow-up	
Number of SEED graduates		Number of SEED graduates reached in follow-up	

Follow-up Process

Describe your follow-up process and any challenges

Action Plans

Percentage of participants who are doing work from their action plan: _____

Percentage of participants who have completed their action plan: _____

Percentage of participants who believe they will complete their action plan: _____

Comments from participants about action plans

Improved Cookstoves

Total Number of Cookstoves built (type of ICS)	Chungu Chungu: TLC Stove:	Number of individuals documented to lower fuel wood usage	Male: Female:
Number of new individuals trained to build ICS	Male: Female:	Number of new individuals trained to use ICS	Male: Female:

Comments from participants about Improved Cookstoves

Permagardens

Number of permagardens		Number of individuals	Female: Male:
Number of Compost projects		Number of individuals	Female: Male:

Comments from participants about permagardening

Tree Nurseries

Number of Tree Nurseries started		Number of individuals involved	Female: Male:
Number of Seedlings		Number of Seedlings planted	

Comments from participants about tree nurseries

Environmental Education

Total Number of education sessions: _____

Session Topic		Individuals taught	Female: Male:
Session Topic		Individuals taught	Female: Male:
Session Topic		Individuals taught	Female: Male:
Session Topic		Individuals taught	Female: Male:

Comments from participants about environmental education

Appendix H. Suggested Follow-Up Protocol

Introducing a Follow-Up Strategy in the Workshop

At the end of the workshop, during the Action Planning session, a follow up date should be planned for when the group (or subgroups if applicable) will come together for a follow up meeting. This meeting should be no longer than a month after the workshop to build on the momentum of the workshop. This date should be used to support and monitor the participants, and it should be directed by the needs of the group along with their action plans. The shape of the day(s) can be a group activity (build a tree nursery fence), a check in to monitor progress and give advice (visiting permagardens and providing additional guidance), or whatever makes sense for the group. The concepts of monitoring and evaluation should be introduced to them during the Action Plan session, and mentioned that this will be a part of the follow up session. The importance of accurate data should be stressed, and that they should be providing real information so that you as a PCV can best support them. Records of work forms should also be passed out on the last day and participants should be instructed on the importance of recording their work and that they should bring these to the follow up session. A potential idea for encouraging participants to record their work could be a competition such as, “whoever builds the most cookstoves gets a seedling as a prize”. Be careful to monitor a completion closely to deter false reporting.

Tips for Monitoring During the Follow-Up

Monitoring needs to be done in a Malawian context, this means building on personal relationships and working within cultural norms. Using a paper questionnaire may lead to confusion with language and has a higher potential for false reporting.

- If possible use a conversational interview style that will help you better understand the progress of any work, provide the opportunity to give guidance for any issues, and build a relationship with that person.
- Try to visibly see any work that is being done! If appropriate, try to visit cookstoves around meal times to see if they are cooking on them, otherwise check for ash or signs of use. Visit peoples gardens, compost piles etc.
 - Asking if people would like a photo with their cookstove/garden/etc. may also give you a way to visit people homes and field. It may also be possible to set funding aside to print photos.
 - Don't make it feel like a test, ask for them to “teach you” about the project (cookstove, garden, fruit drying, etc.), have them tell you what they like and don't. This can reduce the likelihood that a person will say they “like” the intervention when it is not being used.
- Work on your language skills! Have someone help you learn the technical language needed to discuss the project. If your language skills are not adequate yet try to involve a knowledge counterpart or participant.