CLINTON DEVELOPMENT INITIATIVE

Trees of Hope **2014**

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Our Approach

THE CHALLENGE

The effects of climate change, including erratic rainfall and soil erosion, lead to decreasing food and water security, soil productivity, crop yields, forest cover, and biodiversity. These environmental changes threaten the livelihoods of the majority of Malawians, 90 percent of whom are dependent on subsistence rain-fed agriculture. Deforestation, driven by erratic climate patterns and increasing demands of growing population, has become endemic, as wood is the primary – and often sole-source of fuel for heat, cooking, and purifying drinking water.

OUR SOLUTION

In response to increasing deforestation and decreasing crop yields and farmer incomes, the Clinton Development Initiative (CDI) created Trees of Hope in 2007. Trees of Hope, a certified Payment for Ecosystem Services (PES) project, aims to address the effects of climate change while improving the livelihoods of rural farmers in Malawi. Since the project's inception, CDI has assisted more than 2,500 farmers in planting more than 2.6 million trees for land use systems, and has delivered almost $60,000 in additional income to smallholder farmers through the sale of carbon certificates.

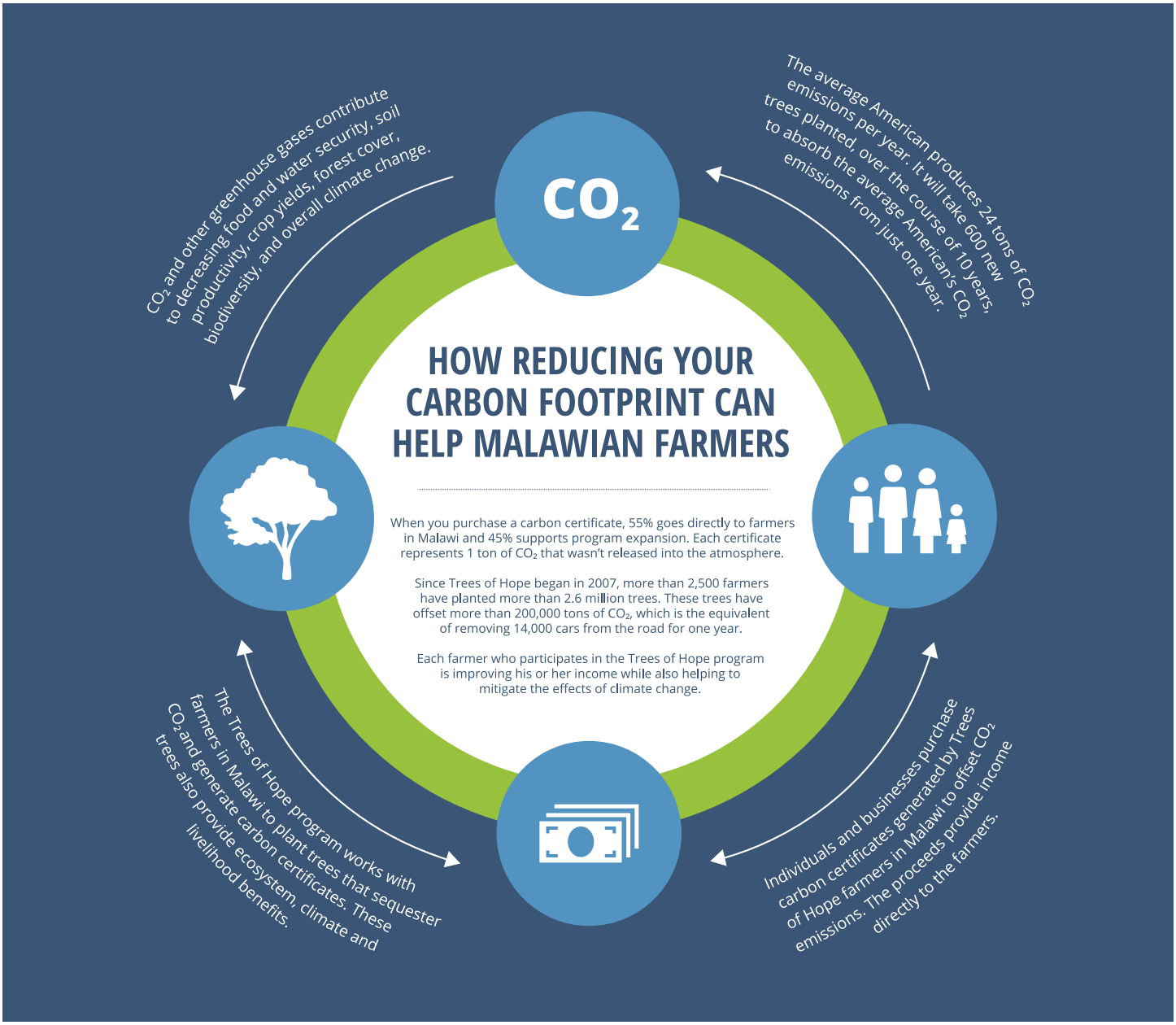
BENEFICIARY PROFILE

Lita Djanjalimodgi

Lita Djanjalimodgi, a female farmer from Kayeta, in the Dowa district of Malawi, began implementing boundary planting and dispersed systematic inter-planting on her farm in 2007. Lita also helps to maintain a community woodlot and mango nursery with the other Trees of Hope participants in her village. These agroforestry interventions have benefited the natural environmental around her home greatly, while also increasing her staple crop yields. With these systems she is now able to sustainably harvest fuel wood to use while cooking for her family. Last year, she received $207 in income from the sale of carbon certificates generated from her agroforestry land-use systems. To put this in perspective, Lita reported that she spends about $5 a week, amounting to $260 a year. This additional income increases her family's spending power by 80 percent. Lita can now afford to send her children to school.

Project Background & Rationale

The Clinton Development Initiative's Trees of Hope project uses an agroforestry land-use systems approach to address the effects of climate change. The purchase of carbon credit certificates generated by smallholder farmers in Malawi increases reforestation and offsets CO_2 emissions, with environmental and ecosystem benefits. Through the Trees of Hope project, smallholder farmers experience increased crop yields, improved incomes and greater food security.



Agroforestry integrates trees, agriculture and livestock systems in a land-management approach to sustainably improve smallholder farmers' livelihoods by strengthening ecosystems, food security, and generating income.

Project Background & Rationale CONT.

The Clinton Development Initiative's Trees of Hope project uses an agroforestry land-use systems approach to address deforestation and help combat climate change. The purchase of carbon credit certificates generated by smallholder farmers in Malawi promotes reforestation and increased tree density, which offsets CO_2 emissions and benefits environments and ecosystems.

The Clinton Development Initiative (CDI) established the Trees of Hope to mitigate the effects of climate change which lead to decreasing food and water security, soil productivity, crop yields, forest cover, and biodiversity. Currently, Malawi faces both high rates of poverty and deforestation. According to the Ministry of Environment and Climate Change, Malawi loses up to 3.9 percent of its forest cover annually, or about 1,000 square kilometers of tree cover. This rapid deforestation is due to climate change and increasing population size. Climate change has made agricultural land less productive – smallholders need to increase the size of their land under cultivation to reap the same yields. Typically, this means cutting down forested lands and converting them to agricultural lands. The combination of low development index score, high poverty rates, and rapid deforestation rates make rural smallholder farmers in Malawi susceptible to severe poverty and food insecurity.

The Clinton Development initiative targeted the Dowa District in the Southern Region of Malawi, with a poverty rate 55.6 percent, as the first Trees of Hope project site. CDI has since expanded to the Neno District. The environment in Neno is ideal for growing fruit trees, and the majority of the population in both districts are smallholder farmers who are engaged in agroforestry.

In order to help decrease these communities' vulnerabilities to climate change and decreased forest size and resources, the Trees of Hope project implements agroforestry systems through afforestation and reforestation. These agroforestry land-use systems address the effects of climate change that lead to decreasing food and water security, soil productivity, crop yields, forest cover and biodiversity, and sequesters carbon. The project aims to improve farmers' resilience to these effects of climate change that disproportionately impact smallholder farmers. The project's efforts are community-led: farmers engaged in Trees of Hope decide which land-use system to implement in their fields. Land-use systems are selected based on land and ecological constraints of the farmer, as well as the projected benefits that each system can create for the farmers' family.

CDI incentivizes agroforestry and generates smallholder income by facilitating access to carbon finance. When carbon certificates are sold, 55 percent of the proceeds are paid to the farmer over the first 10 years of a tree's life, encouraging proper care and safety for the growing trees. The remaining 45 percent is reinvested in project expansion and development. The Trees of Hope project is certified as carbon sequestration project by the Plan Vivo Standard. Plan Vivo – an organization headquartered in Edinburgh, Scotland – promotes "climate justice" through poverty relief, improving the livelihoods of rural farmers and building capacity in developing countries to enable sustainable, long-term land management. The Plan Vivo Standard ensures that land-use projects that receive the certificate are focused on promoting sustainable development, improving rural livelihoods and ecosystems, and protecting biodiversity.

Every Plan Vivo offset certificate represents the future avoidance, or sequestration, of one ton of CO_2, in addition to a wide range of livelihood and ecosystem benefits. All Plan Vivo carbon certificates are registered with the Markit Environmental Registry and possess a unique serial number that is retired from the registry once purchased.

A carbon certificate is unique to the Plan Vivo Standard and provides both climate services and livelihood benefits for smallholder farmers in Malawi. A certificate is given to purchasers to recognize the transaction toward reducing greenhouse gas emissions.

Technical Components

LAND-USE SYSTEMS

The technical specifications of the land-use systems have been modeled to assess the carbon offset potential over a 50 year crediting period. CDI and our farmers contracted through Trees of Hope build in a 20 percent risk buffer to account for any unexpected or unintended loss of tree growth. Currently, Trees of Hope offers five land-use systems:

LAND-USE SYSTEMS		DENSITY/SPACING	NET CARBON TRADING POTENTIAL
MIXED WOODLOTS	This system involves the establishment of indigenous and/or naturalized tree species on a plot of land in a systematic manner.	2,500 trees per hectare	150 tCO_2e/ha
BOUNDARY PLANTING	This system involves the linear planting around amenities. It is commonly used around producers' farms for boundary demarcation, but can also be used to protect field from intruders or livestock.	Up to 3 meters apart in a single row	8 tCO_2e/ha (per 100 meter linear length)
DISPERSED SYSTEMATIC INTER-PLANTING (DSI)	This system involves inter-planting trees with arable crops to improve soil fertility over time through the addition of degradable organic matter to the soil and biological nitrogen fixation. DSI is ideal for producers with limited land holdings.	Initial density of 200 trees per hectare dependent on landscape constraints	72 tCO_2e/ha
CITRUS ORCHARDS	This system involves the planting of high-value citrus varieties produced from local seedling rootstock through bud-grafting. These improved varieties not only produce high value fruits, but also reach fruiting age in 4 years, much earlier than local varieties.	400 trees per hectare	56 tCO_2e/ha
MANGO ORCHARDS	This system involves the planting of high-value mango varieties produced through grafting improved scion varieties onto local rootstock varieties. These improved varieties produce less fibrous, more fleshy fruits, that reach fruiting age in 3–5 years, much earlier than local varieties.	200 trees per hectare	85 tCO_2e/ha

Process of Smallholder Engagement

1. COMMUNITY SENSITIZATION

Trees of Hope is a community-led process and engagement in the project is entirely demand driven by communities. CDI Trees of Hope field officers hold general meetings in targeted communities to sensitize the population at large about the project, highlighting mitigation and adaptation strategies for climate change. Community sensitization enables prospective project participants to make informed decisions to join the project.

2. FARMER REGISTRATION

Following the community sensitization model, Trees of Hope field officers work with the interested farmers to properly select the land-use system based on the existing landscapes, ecological constraints, and the desires and needs of the households or groups. The farmers are then registered in the project.

There are more than 2,500 smallholder farmers implementing tree-based land-use systems to date, 12 percent of which currently have Payment for Ecosystem Services (PES) Agreements, either as individuals or communal groups. Based on what is most beneficial to farmers and their families, farmers can implement more than one land-use system. A mix of land-use systems is common amongst individual farmers. For example, communal groups typically select woodlots or fruit tree orchards. Currently, 90 percent of the Trees of Hope participants are registered as individuals, while the remaining 10 percent are groups, such as schools or village collectives.

3. PLANTING

As seen in the table below, the mixed woodlot, boundary planting, and dispersed systematic interplanting (DSI) land-use systems are selected the most by farmers due to familiarity with existing cropping patterns and ease of management and maintenance. Fruit trees, such as mango and citrus, demand large amounts of water, and significant technical management, maintenance and protection in their early years – making them less desirable for farmers with limited resources. However, fruit orchards offer additional livelihood and food security options for farmers with adequate ecological and time resources to dedicate to their fruit trees.

Determining the total area of the plot on which trees are planted is essential to calculating carbon sequestration potential. Based on the land holding size, variables to be calculated include:

- Number of seedlings to develop
- Tree species to select (based on land-use system)
- Carbon certificate potential of the selected system

LAND USE SYSTEM AMOUNTS FOR TREES OF HOPE

LAND USE SYSTEM	AREA COVERAGE	NET TRADABLE CO_2 POTENTIAL
Mixed Woodlot	294 hectares	150 t/CO_2 e/ha
Boundary Planting (BP)	9,157 100 meter units	8 t/CO_2 e/ha
Dispersed System Interplanting (DSI)	350 hectares	72 t/CO_2 e/ha
Citrus Orchard	39 hectares	56 t/CO_2 e/ha
Mango Orchard	42 hectares	85 t/CO_2 e/ha

Process of Smallholder Engagement CONT.

4. CAPACITY BUILDING

Upon joining the Trees of Hope project, farmers are trained and equipped with new knowledge and skills, providing them the opportunity to enhance their lives, ecosystems, and incomes. This training teaches them how to establish nurseries, grow seedlings, transplant them, and care for trees over their lifetime. To increase local capacity and provide easy access to program support, communities select voluntary leaders called Local Program Monitors (LPMs) to coordinate the program at the community level. Currently, the program has more than 50 volunteers who act as liaisons between the communities, CDI, and other stakeholders.

The training sessions target participating communities, LPMs, and registered smallholder farmers. They are created to ensure that producers understand the requirements of the program, enabling them to make informed decisions in joining and carrying out their activities in line with the Plan Vivo guidelines. The LPMs receive more detailed and frequent training from CDI staff than producers, with the expectation that they in turn will train fellow producers to supplement efforts by CDI staff.

Through these trainings, smallholder farmers engage in topics that include:

- The Trees of Hope and Plan Vivo framework
- The impact of climate change on their lives and mitigation strategies to avoid future damage; and, carbon trading and finance, which help farmers recognize that they are engaged in a trade system rather than an aid system

Participating farmers also learn technical agroforestry skills:

- Nursery establishment, maintenance, and management
- Land-use system establishment and management. This includes all four systems: wood lots, fruit tree orchards, boundary planting, and dispersed planting. Contracted farmers learn the skills and dedication it takes to care for a tree in its early years and throughout its lifecycle, including watering, protection, and pruning
- Monitoring protocols with relation to carbon finance.

5. MONITORING

The registered farmers' land-use systems are routinely monitored to assess progress towards targets such as trunk diameter and tree survival rate. For farmers with PES agreements, their ability to meet targets in these areas is the key to unlocking the corresponding payment installment at each monitoring period as the targets are met. Data collection and analysis are the most important aspects of Plan Vivo project operability. CDI manages data in a database, tracking all vital operations of the Trees of Hope project. Field data is collected, stored and processed by the Trees of Hope Project Manager, and six trained field technicians, with assistance from the LPMs.

6. SALE OF PLAN VIVO CERTIFICATES

CDI currently partners with two organizations to engage in the sale of carbon certificates generated by the Trees of Hope project: U&We/ZeroMission and Carbon Offsets to Alleviate Poverty (COTAP). U&We/ZeroMission, based in Sweden, participates in carbon offsetting retail and analysis. They market CO_2 offsets to companies in large quantities. The price per ton of CO_2 is dependent on order size. COTAP is a California-based organization that has historically marketed to the individual consumer at a price of $9.90 per ton of CO_2. COTAP seeks to empower smallholder farmers to combat climate change and alleviate poverty in addition to offsetting carbon. Both companies' pricing per ton of CO_2 include financing for farmer Payments for Ecosystem Services (PES) as well as continued project expansion and evaluation.

When Plan Vivo Certificates are sold, farmers who hold PES agreements and are meeting the monitoring targets are paid the corresponding installment amount. Through December 2013, CDI sold 13,317 carbon certificates. In the first half of 2014, CDI sold 11,524 carbon certificates, bringing the total to 24,841. Through 2014, CDI has delivered almost $60,000 in additional income to project participants with PES agreements.

To ensure accountability, increase security, and improve financial inclusion for the participating farmers, CDI is partnering with First Merchant Bank. Project participants with PES agreements open bank accounts with First Merchant Bank and are issued debit cards on which to receive payment installments from certificate sales. These bank accounts unlock financial market access for the smallholders by linking them to First Merchant Bank's savings and credit products and local service centers, and empower the farmers through increasing financial security and stability for the project participants.

Benefits & Impact

In 2013, CDI began distributing the payment installments to farmers with PES agreements. To date, almost $60,000 has been distributed to 294 farmers and farmer clubs, an average of $129 per farmer and $232 per farmer group. In Malawi, 90 percent of the population lives on less than $2 per day and rely on subsistence level farming and other income generating activities to feed and take care of their families. This influx in capital, which increases the average farmer's annual spending power by over 30 percent, enables farmers to invest in their farms, homes, and families.

How Farmers Benefit From Carbon Finance

Carbon finance can directly benefit smallholder farmers' quality of life. Their improved purchasing power increases their overall access and connectivity to goods and services.

TRANSPORTATION
Farmers can purchase bicycles, increasing mobility and access to markets.

LIVESTOCK
Farmers can purchase livestock, improving incomes and household nutrition.

FARM INPUTS
Farmers can buy improved seed and fertilizers, increasing crop yields.

SAVINGS
Farmers can save for future investments in their farms, homes, and families.

EDUCATION
Farmers can pay for school fees and purchase school supplies for their children.

CONNECTIVITY AND ELECTRICITY
Farmers can buy cell phones, solar chargers, and radios.

HOUSEHOLD IMPROVEMENTS
Farmers can invest in fences, roofs, and latrines.

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PURCHASER BENEFITS AND IMPACT

Reduction of Carbon Footprint: Purchasing carbon certificates to offset a business's carbon emissions establishes a business's ethical obligation and drive to protect the environment. Choosing a Plan Vivo project for carbon offsetting demonstrates a business's awareness of the negative impacts that large carbon footprints can have on the environment and vulnerable communities.

Corporate Social Responsibility (CSR): CSR demonstrates a business's commitment to the interests of its stakeholders – investors, employees, customers, and local and global communities impacted by the business operations. As part of their CSR efforts, businesses can choose to offset their carbon emissions through purchasing carbon certificates from projects such as Trees of Hope. Trees of Hope carbon certificates offer an additional value by supporting smallholder farmers affected by climate change. These benefits greatly impact a business's standing, garnering a positive consumer image. Additionally, these investments result in increased customer loyalty and interest in the company, what they stand for, what they are selling, and the industries in which they are engaged. By fostering more support from consumers and investors, the company can solidify its reputation as a socially responsible enterprise.

SMALLHOLDER BENEFITS AND IMPACT

Financial Benefits: The Trees of Hope project has generated more than 200,000 tons of CO_2, and issued and sold certificates for 12 percent of the total tons of CO_2 generated to date. CDI has the capacity to generate an additional 70,000 tons of CO_2 per year by expanding the project to approximately 800 additional farmers annually.

The sales of these certificates generate additional incomes for farmers. The existing 200,000 carbon certificates will deliver over $800,000 total in income to the Trees of Hope project participants. With the rapid expansion projections, Trees of Hope will increase future participating farmer revenues by over $300,000 each year.

The products from the tree species utilized within the land-systems also have the ability to generate financial benefits for smallholder farmers. Trees of Hope orchards generate fruit that can contribute to food security and also increased income from market sales. Woodlots also provide additional incomes for farmers from the sales of timber, poles, and firewood.

The implementation of agroforestry provides farmers with environmental benefits that improve the agricultural productivity of their land. The dispersed systematic inter-planting and boundary planting systems provide additional benefits to companion crops and gardens in the form of leaf litter, nitrogen fixation, and water holding capacity. Increased crop yields have been noted worldwide under intercropped *Faidherbia albida* in the DSI land-use systems.

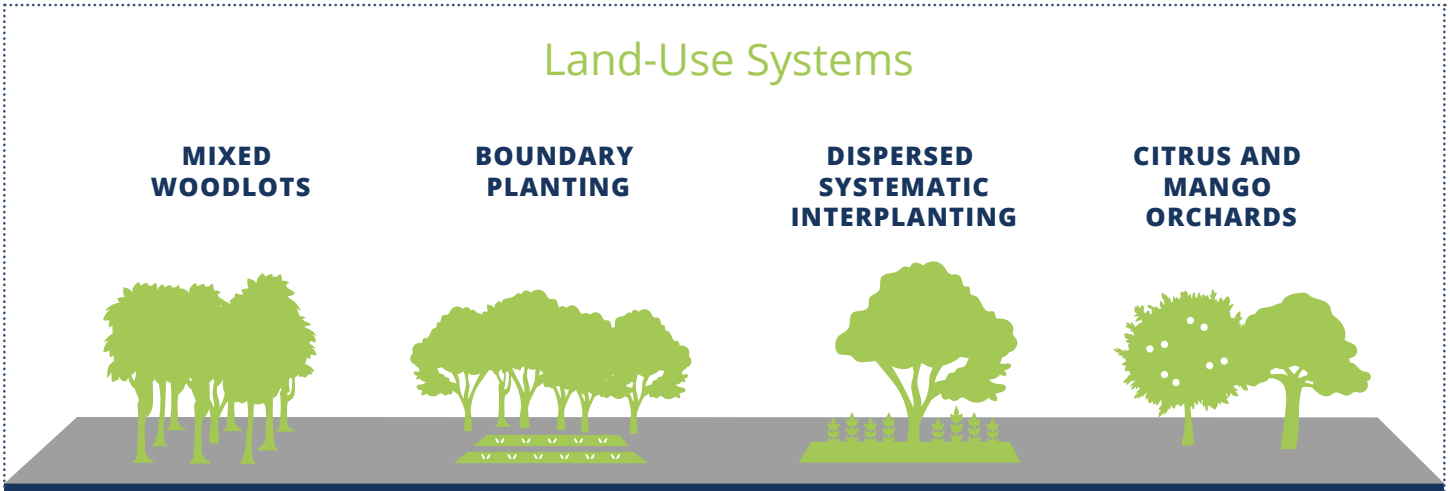
Approximate Cost of Living in Rural Malawi

High Quality Soya Seed per Hectare: $175	Staple Food for a Family of 6 per Month: $12.50
Shoes: $4	School Uniform: $22.50
School Fees per year: $120	Bicycle: $110
Mobile Phone: $12	Cow: $375
Goat (Adult): $20	Chicken: $8

ECOSYSTEM & LIVELIHOOD BENEFITS FOR PARTICIPANTS

The Trees of Hope project and its five land-use systems provide benefits and products to both smallholder farmers and their environments.

Land-Use Systems



MIXED WOODLOTS	BOUNDARY PLANTING	DISPERSED SYSTEMATIC INTERPLANTING	CITRUS AND MANGO ORCHARDS
Benefits			
Firewood and timber	Firewood	Firewood and timber	Fruit (for consumption, sale, and value added processing)
Livestock fodder	Livestock fodder	Livestock fodder	Firewood and timber
Traditional medicine	Traditional medicine	Traditional medicine	Traditional medicine
Sustainable charcoal production	Increased soil organic matter	Sustainable charcoal production	Hydraulic benefits
Increased soil organic matter	Protection of fenced area from livestock and wind damage	Increased soil organic matter	Soil conservation
Soil conservation	Soil conservation	Hydraulic benefits	Preserved or increased biodiversity benefits
Hydraulic benefits	Hydraulic benefits	Soil conservation	
Preserved or increased biodiversity benefits	Preserved or increased biodiversity benefits	Preserved or increased biodiversity benefits	
		Increased crop yields	

The integration of trees into current rural landscapes allow for more resilient, stable and ultimately healthy and productive environments. Moreover, the creation of woodlots provides farmers with sustainable sources of wood, removing the increasing pressure being placed on the environment from continual harvesting of timber and firewood from the forests. As mentioned earlier, deforestation is the largest driver of environmental degradation, increasing the vulnerability of our farmers.

Products of the five land-use systems include but are not limited to:

- Fruit
- Timber
- Firewood
- Traditional medicine
- Livestock fodder
- Honey

Future Project Expansion & Income Diversification Opportunities

CDI invests 45 percent of the carbon revenues back into the expansion and development of the Trees of Hope project. Looking forward, the Trees of Hope project is working to identify and engage in projects to generate alternative sources of income for smallholder farmers. CDI is currently exploring value added processing of mango among the farmers who have trees that are mature and producing fruit.

A quarter of the mango orchards are currently producing mature fruit and country-wide, the majority of mangoes are wasted due to spoilage and inadequate preservation and storage capacity. CDI is in the early stages of developing a local solar drying mango business pilot, with the potential to sell both domestically and internationally. Post-harvest processing of this resource will not only reduce waste, but transform it into an alternative profitable enterprise and source of income for smallholder farmers while also increasing food security. The drying of mangoes ensures that farmers and their families will have access to the nutrients available in the dried mango for the entirety of the year, as opposed to the limited four month mango season. The solar dryers CDI will utilize with the farmers will be constructed from locally sourced materials and powered by solar energy, and therefore not rely on the energy grid which is often unreliable and expensive, further supporting environmental stability.

Alternative industries to expand into include: apiculture, furniture construction, high-nutrient animal fodder sale, sustainable charcoal processing, *Azadirachta indica* as a natural pesticide and many others.

Fight Poverty and Climate Change

Support for the Trees of Hope project will not only help reforest a vastly degraded region of the world, but will also generate income for smallholder farmers and bolster the local ecosystem. Purchasing carbon certificates from Trees of Hope will demonstrate a strong commitment to social responsibility, simultaneously reducing or completely offsetting your carbon footprint.