Equator Initiative Case Studies
Local sustainable development solutions for people, nature, and resilient communities

KASISI AGRICULTURAL TRAINING CENTRE (KATC)
Zambia

Empowered lives.
Resilient nations.
Local and indigenous communities across the world are advancing innovative sustainable development solutions that work for people and for nature. Few publications or case studies tell the full story of how such initiatives evolve, the breadth of their impacts, or how they change over time. Fewer still have undertaken to tell these stories with community practitioners themselves guiding the narrative. The Equator Initiative aims to fill this gap.

UNDP’s Equator Initiative, in partnership with ENDA Tiers Monde (ENDA), Open Society Initiative for Southern Africa (OSISA), United Nations Convention to Combat Desertification (UNCCD), and funded by the Global Environment Facility (GEF), identified examples of local ingenuity, innovation, and leadership in sustainable land management (SLM) in drylands in Sub-Saharan Africa. The following case study is one in a series that describes vetted and peer-reviewed best practices in SLM management, with the purpose of inspiring the policy dialogue needed to take local success to scale, to improve the global knowledge base on local environment and development solutions, and to serve as a model for replication.

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PROJECT SUMMARY

Reaching over 10,000 small-scale farmers, Kasisi Agricultural Training Centre provides agricultural training, extension services, research and marketing support to local farmers. Demonstration plots are used for hands-on learning and for agricultural research. The center maintains a production unit where dairy cows, sheep and other livestock are raised and the milk is sold to a local milk processor. Through extension services and direct training to farmers, the center has helped increase local maize yields to levels well above the national average, resulting in greater food security and improved incomes. Crop rotation, reforestation, new irrigation schemes and agricultural diversification have all contributed to increased availability of different food types, improved food security, better nutrition and the conservation and sustainable use of local ecosystems. Biodiversity fairs have been used to help farmers share knowledge on local varieties of seeds, crop diversity, apiculture and agroforestry techniques. The center has facilitated a village saving initiative, which has enabled several women to access capital to start small-scale enterprises.

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The Kasisi Agricultural Training Centre (KATC) is located 30 kilometers northeast of Lusaka, Zambia’s capital, in Chongwe District, close to the Kenneth Kaunda International Airport. Kasisi Agricultural Training Centre works on the ground with farmers living in Chongwe and Rufunsa Districts, where agriculture is the primary livelihood. The major crops grown in the area include maize, groundnuts, cow peas, soy beans, sweet potatoes and cassava. The dominant vegetation type in the two districts is dry Miombo woodland and Mopane woodland. Chongwe district borders the Lower Zambezi National Park, one of the country’s premier parks.

In recent years, Chongwe and Rufunsa districts have experienced massive deforestation, driven in large part by demand for firewood and charcoal. As a result, firewood is scarce in some areas within the two districts. Poor agricultural practices and long term intensive use of synthetic chemical inputs, such as chemical fertilizers and pesticides, have severely degraded soils and reduced agricultural yields, leading to greater dependency on fertilizers and spurring additional clearing of forests for new fields. Changing rainfall patterns have brought drought and dried up streams, further endangering farmer livelihoods. Despite the introduction and continued support of the Farmer Input Support Program (FISP), which takes up over 57 percent of the national agricultural budget, poverty in Zambia’s rural areas has remained at an alarmingly high rate of 80 percent.

Copper mining is the most important source of GDP in Zambia. Most rural Zambians are subsistence farmers. Extreme poverty is widespread, with 67 percent of the population living on less than one USD a day. Thirteen percent of the population is infected with HIV/AIDS and life expectancy at birth is 58 years.
“Our driving philosophy,” says Dr. Henrietta Kalinda, Deputy Director of the Kasisi Agricultural Training Centre, “is to work with nature and not against nature.” KATC implements this philosophy by training farmers to eschew expensive synthetic farming inputs such as fertilizers and pesticides in favor of cost-effective, locally-available, environmentally-friendly products like compost, green manures and plant-based pesticides. Through trainings in organic agriculture, agroforestry, appropriate technology and livestock management, farmers are able to restore degraded lands and improve their livelihoods.

### Organic agriculture

When the Kasisi Agricultural Training Centre first opened its doors in 1974, it offered two-year residential programs to farmers focusing on conventional agriculture techniques that used tractors, synthetic fertilizers and pesticides. After years of trainings, graduate farmers only saw small, incremental gains in their harvests. More troubling, their soils were becoming more compacted and infertile, requiring ever greater inputs of costly synthetic fertilizers. By 1990, Kasisi Agricultural Training Centre decided to abandon conventional agriculture in favor of organic agriculture. As KATC Executive Director, Br Paul Desmarais SJ noted, “The reason we went into organic agriculture was that I could see the conventional way of farming was not sustainable.”

Since 1990, Kasisi Agricultural Training Centre has taught organic farming practices to more than 10,000 small-scale farmers from Zambia as well as Malawi, Zimbabwe, Tanzania and Burundi. Kasisi Agricultural Training Centre offers three- to five-day and two week courses covering a range of topics of interest to subsistence farmers including farm management, organic vegetable production, agroforestry, dairying, animal traction, organic integrated pest management, organic cotton production and beekeeping. The courses are offered at the center as well as at on-farm demonstration plots in communities.

To wean farmers from synthetic fertilizers, KATC promotes restoration of soil fertility through inputs of compost and animal manure, use of green manures such as Sunn hemp and velvet beans and planting of nitrogen-fixing shrubs, trees and cover crops, such as cowpeas. In addition, trainees learn complementary land management practices that conserve and build soils, such as no-till farming, mulching, crop rotation and improved fallows. To lessen reliance on chemical pesticides, farmers are equipped with knowledge and skills in integrated pest management methods such as mulching, intercropping of species to attract beneficial insects and the use of natural pesticides such as diatomaceous earth. Farmers are also introduced to new crops and the concept of intercropping. By diversifying crops, farmers attract more beneficial insects, improve their diets and buffer themselves against over-reliance on a single crop.

To reduce farmer’s annual expenses relating to the purchase of hybrid seed, KATC promotes the use of native/local seeds and open-pollinated varieties of maize. Seeds from these plants can be saved...
and used for planting in the following year. To prove to farmers that open-pollinated maize can yield as much as hybrid maize, KATC planted demonstration plots of open-pollinated maize, some of which produced more than 9,000 kilograms per hectare (average maize production in Zambia is roughly 1,500 kilograms per hectare). To insure that farmers in the two districts have access to seed, KATC facilitated the start up of local seed production in the area and assisted with the establishment of the Chongwe Organic Seed Growers Association. KATC also helped to set up the Chongwe Organic Producers and Processors Association (CHOPPA), an organization that facilitates profitable market linkages for farmers.

Agroforestry

Kasisi Agricultural Training Centre promotes agroforestry as a multi-purpose tool to improve soil fertility, increase biodiversity, enhance food security and create income generating opportunities. Trees add organic matter to the soil, reduce erosion and improve soil conditions (e.g., by holding more water). Nitrogen-fixing trees, such as sesban (Sesbania sesban), can be used as a fallow crop to improve soil fertility. Grown for a period of two to six years, they can be harvested for fuel wood. Compared with slash and burn agriculture, such methods are a quicker and more environmentally-friendly way of improving soil fertility and structure. Kasisi Agricultural Training Centre also promotes alley farming, a practice of planting nitrogen-fixing trees alongside agricultural crops as a source of mulch and nutrients.

One of the flagship trees promoted by the Kasisi Agricultural Training Centre is moringa (Moringa oleifera). Moringa is drought-resistant and produces protein-rich, nutritious, edible leaves. Other trees with protein-rich leaves, such as white leadtree (Leucaena leucocephala), are promoted as sources of fodder to improve livestock health. The leaves of neem (Azadirachta indica), Vogel's tephrosia (Tephrosia vogelii) and snake bean (Bobgunnia madagascariensis) yield natural pesticides that can be powdered or infused as a “tea” and then applied to crops. An extract of the leaves of Vogel's tephrosia is also an effective tick-control agent for livestock.

Planting of fruit trees, such as papayas, mangoes, oranges, guavas and lemons, improves diets and offers income generating possibilities. The Kasisi Agricultural Training Centre also teaches farmers how to use trees for windbreaks or as living fences. Trees selected for such uses serve multiple purposes. For example, mulberry (Morus spp.) or physic nut (Jatropha curcas) yields fruits or oil, respectively, in addition to acting as a living fence. Farmers can also pollard the tops of the trees, such as kassod tree (Senna siamea), in the living fence for firewood. To sustain agroforestry efforts in the community, KATC helped establish 30 community nurseries where over 5,000 seedlings are grown annually. KATC's work has underscored the importance of conserving forests to local farmers and many of its graduate trainees now set aside land for the re-establishment of native forests. A number of farmers use such forests for beekeeping.

Livestock

In collaboration with the Micro Bankers Trust and the Dairy Association of Zambia, KATC is implementing the Chongwe Green Society project, an initiative to restore degraded lands and improve livelihoods. In addition to agriculture and agroforestry, the pilot project incorporates dairy management. Through low-cost loans from the Micro Bankers Trust, farmers are able to purchase two dairy cows. KATC and the Dairy Association of Zambia provide technical training on animal management and encourage the formation of study circles to share and expand knowledge of animal husbandry. The cows produce an average of 10 to 25 liters of milk per day, giving farmers a
reliable income source. To date, none of the farmers has defaulted on their loans and neighboring communities have expressed interest in adopting dairying. In another initiative, KATC expanded goat herds in one community by implementing a “pass on the gift” program. An initial group of farmers were given breeding pairs of goats and asked to pass on two offspring to their neighbors. The program grew to include more than 100 farmers. KATC also promotes small animals, including poultry, as a source of protein and manure. Courses at Kasisi Agricultural Training Centre addressing livestock management include: basic dairy and pastures, intermediate dairy and pastures, small animal production and manure handling and storage. Demonstration herds at KATC include 35 dairy cows, more than 100 beef cattle and 30 sheep, and there are plans to increase their numbers.

**Appropriate technology**

Kasisi Agricultural Training Centre encourages the use of appropriate technology for small-scale farmers. This means, for example, using oxen rather than tractors. Oxen are more cost-effective and reliable than tractors, provide manure as an input to soils and can be used for other farm tasks. KATC offers an animal traction and donkey utilization course that teaches farmers how to use and manage donkeys. Kasisi Agricultural Training Centre also offers a course in blacksmithing which provides students with the knowledge of how to make hand tools and spare parts such as axes, nuts and bolts, hoes and plough shears. KATC offers additional courses in how to create inexpensive, low-maintenance items to improve rural farms including treadle water pumps, hand-operated oil presses, maize and groundnut shellers and solar cookers.

In the Chongwe Green Society project, KATC is training dairy farmers how to use cow manure to power biodigesters. The biodigesters provide smokeless heating, lighting and cooking and reduce the need for firewood. The by-product of the biodigester, bio-slurry, can be used as a fertilizer. Solar ovens are another strategy that KATC is promoting to local communities to wean their dependence upon firewood in order to slow deforestation. Solar ovens are particularly attractive because they are a low-cost item that can be produced from locally-available materials.

**Outreach**

The Kasisi Agricultural Training Centre holds annual field days at demonstration plots, on small-scale farms, at schools and at the centre itself. These events promote organic agriculture and attract hundreds of participants, including farmers, private sector traders, students, professors and politicians. KATC encourages the uptake of organic agriculture in Chongwe and Rufunsa Districts through education and use of lead farmers. The lead farmers are taught organic agriculture methods, shown how to establish demonstration plots and asked to work with 10 to 20 of their neighboring farmers to pass on the knowledge and skills they have acquired. The Kasisi Agricultural Training Centre also conducts outreach with Parliamentarians, the House of Chiefs and village headmen, sensitizing them to the benefits of organic agriculture. KATC staff met with 68 village headmen in 2014 and sought to work with them in developing action plans for the adoption of organic farming methods at the village level. Kasisi Agricultural Training Centre also produces weekly radio programs on organic farming techniques that are broadcast on community radio. The radio programs address a range of topics including sustainable agriculture, integration of small animals, agroforestry, dairy and pastures, tree planting and agribusiness, which includes marketing of farm produce.

“Resilience helps farmers survive better/withstand highly variable weather conditions thus introducing an element of stability in yield and production even in harsh conditions. This is achieved by adapting and adopting individual, family, group strategies to best deal with the recent changes in agriculture and the environment in general.”

*Annie Matutu, Organic Farmer*
Impacts

BIODIVERSITY IMPACTS

Using technologies and practices taught by the Kasisi Agricultural Training Centre, subsistence farmers have improved the fertility and structure of local soils, replanted forests and increased agricultural biodiversity, actions which have helped to counteract years of environmental degradation.

Reversing land degradation

One of the greatest biodiversity impacts of KATC’s trainings is largely invisible to the naked eye. It involves the restoration of the natural biodiversity of native soils. Organic farming practices, such as aeration and inputs of manure and organic matter, increase the diversity of microorganisms in soil, which in turn facilitates infiltration and storage of water as well as nutrient cycling.

Farmers using conventional agricultural methods often rely on a small number of crops. By contrast, farmers trained at KATC grow a dozen or more crops, often intercropped, in addition to tree crops. These farms exhibit more agro-biodiversity than farms managed under conventional agricultural practices and provide habitat for more organisms. Kasisi Agricultural Training Centre’s agroforestry initiatives have restored tree cover to a badly deforested area of the country. These small plots of forest retain water content in soil and provide habitat for birds and pollinators.

Kasisi Agricultural Training Centre is also committed to conserving local knowledge of plant breeding and the local diversity of plant seed sources. Unlike hybrid seed, local seed is better adapted to local soils and climatic conditions. And unlike hybrid seed, the seeds of local varieties of plants can be saved after harvest and used for the following year’s planting. Preserving local seed saves small-scale farmers money and improves community resilience to future economic and ecological vicissitudes, particularly those brought about by climate change. Five communities in Chongwe and Rufunsa Districts are presently identifying and cataloguing the availability and use of local crops as well as useful wild species. The Kasisi Agricultural Training Centre facilitates the hosting of annual biodiversity fairs in communities. Here, farmers can come together to exchange seeds and knowledge of plant management. These activities serve to resuscitate and preserve native biodiversity and traditional knowledge.

SOCIOECONOMIC IMPACTS

Kasisi Agricultural Training Centre takes a holistic approach to rural development that addresses environmental sustainability, economic empowerment and social justice. Farmers trained by KATC have increased yields and diversified their sources of income. Women have been empowered to assume leadership positions.
Increased food security

Organic agricultural practices implemented by subsistence farmers have increased yields and led to greater food security. In one project funded by the Scottish government, farmers trained by the Kasisi Agricultural Training Centre saw their average annual yields of maize grow from 1,400 kilograms per hectare to 2,400 kilograms per hectare over two agricultural seasons. Farmers participating in a different program implemented by KATC increased the amount of food retained for home consumption by more than 170 percent. Once only able to grow enough food to feed their households for six months out of the year, many participants in the program were able to grow a full year’s supply of food. In addition to increased yields, farmers trained at KATC have diversified their outputs as well as their diets with the addition of products such as milk, honey, fruits, a variety of vegetables and moringa leaves. Increased food security and better nutrition are critical to community well-being. Improvements in diet are particularly important for people living with HIV/AIDS because a balanced diet bolsters the immune system and the body’s ability to fight the disease.

Improved livelihoods

Many farmers trained by the Kasisi Agricultural Training Centre have seen their incomes increase due to greater yields and diversification of income streams. Graduates of KATC’s blacksmithing course earn extra income in their villages from making and fixing tools. Agroforestry and beekeeping projects have given farmers new opportunities to earn income from the sale of fruits and honey. One farmer trained at Kasisi Agricultural Training Centre planted a “food bank” of 300 moringa trees on his land. The farmer dries and pounds the moringa leaves and sells them in Lusaka, making a good income.

When they were practicing conventional agriculture, many small-scale farmers had to rely on loans to access seeds, fertilizers and pesticides. Organic farming practices eliminate such expenses and the specter of dependence on external actors. Observes farmer Moses Mulenga, “The most important thing for me is the freedom I now have. I don’t have to depend on loans. I can grow whatever crops I like, and save and replant my own seeds.”

Interim analysis of one of KATC’s ongoing projects, a conversion to organic agriculture initiative funded by the Canadian International Development Agency, found that participating farmers’ average cash value increased by more than 800 percent over a period of two agricultural seasons. As a result, farmers were able to pay their children’s school fees, make improvements to their homes and purchase livestock and other assets. Dairy farmers participating in the Chongwe Green Society Project, a joint venture funded by Hivos and implemented by a consortium comprising the KATC, the Diary Association of Zambia and the Micro Bankers Trust, are receiving daily income from milk sales. Farmer Jonah Moonga says of his two cows, “There is money here; it is a ‘Bank of Zambia.’ I may look simple but these animals have brought me money.”

Many graduates of KATC take pride in their accomplishments. Farmer Rainford Chanshika grows prize-winning organic crops that out-compete conventionally-grown produce at agricultural fairs. Says Chanshika, “Organic farming has really improved my life. Even at agricultural shows, my organic produce attracts the attention of many people. I have even won many awards at block, district and commercial shows.”

Resilience

Conventional agricultural practices in Chongwe and Rufunsa Districts in Zambia degraded and compacted soils and reduced farmer yields. As subsistence farmers in the area became dependent upon ever increasing inputs of synthetic fertilizers, their food security decreased while their vulnerability to the impacts of climate change increased. Adoption of organic agricultural practices has made farmers more self-sufficient and freed them from debt and reliance upon food aid during drought years. Farm diversification, through agroforestry, beekeeping and integration of livestock and intercropping, has increased farmer resilience to economic and environmental stressors. By producing multiple products, farmers can better cope with the failure of a single crop. Better quality soils, the use of locally adapted crop varieties, intercropping of multiple species and expansion of tree and crop cover has increased agricultural biodiversity, improved soil water retention and nutrient content and increased farmer resilience to drought and other weather fluctuations associated with climate change.
GENDER

Sixty-five percent of Zambia’s subsistence farmers are women; therefore, women stand the most to gain from the agricultural trainings offered by the Kasisi Agricultural Training Centre. KATC is committed to female empowerment and maintains a policy that stipulates female representation in all training programs be 30 percent or greater. At present, women account for 35 to 45 percent of all trainees at KATC and women are encouraged to take leadership roles in the training courses and in community groupings. Because women are often the primary care-givers for children, the sick and the elderly, many women do not have the time to attend residential training at KATC. As a consequence, the Kasisi Agricultural Training Centre implemented on-farm trainings in the community and increased female participation rates above 50 percent. KATC’s current Deputy Director is a woman.

The Kasisi Agricultural Training Centre facilitated the establishment of five village savings groups to enable group saving and lending among members. Each group is composed of approximately 25 women who make a monthly contribution to the savings fund. The pooled money is used to provide loans to its members and to serve as a social fund for community members in need. The village savings schemes have allowed several women to start businesses such as groceries and selling second-hand cloth. The ability to own a business and secure a stream of income has improved women’s self-worth and raised their status in the community.

POLICY IMPACTS

The Kasisi Agricultural Training Centre is a district, national and regional champion for organic agriculture and is widely consulted on the topic by a range of stakeholders. KATC trains government agricultural extension agents as well as agricultural outreach agents for development NGOs. The Kasisi Agricultural Training Centre maintains a good relationship with the Zambian Ministry of Agriculture and Livestock at the headquarters and district levels and works closely with the Ministry of Agriculture and Livestock extension staff on the ground. Due to lobbying efforts by the Kasisi Agricultural Training Centre, organic agriculture is increasingly being introduced and taught as a subject at institutions of higher learning including the University of Zambia and the Natural Resource Development College. Undergraduate and graduate students use the center as a site for agricultural and social research.

At present, organic agriculture is not formally recognized or supported by the Zambian government. To address this policy gap, Kasisi Agricultural Training Centre, working with the Jesuit Centre for Theological Reflection, created a policy brief on organic agriculture and presented it to the parliamentary committee on Agriculture and Environment as well as to the House of Chiefs. Parliamentarians and members of the House of Chiefs have been invited to the Kasisi Agricultural Training Centre and been given tours to see for themselves the benefits of organic agriculture in practice.

The Kasisi Agricultural Training Centre is a member of the Zambia Alliance for Agro-ecology and Biodiversity Conservation (ZAABC), a coalition of Zambian NGOs that opposes the importation and sale of genetically-modified seeds and foods in Zambia. The ZAABC and Kasisi Agricultural Training Centre advocate against the harmonization of Seed Trade Laws in the region and the possible resulting importation of genetically modified seed because they contend such actions will: 1) make Zambian farmers reliant on expensive, genetically-modified seed from multi-national corporations, 2) criminalize the current practice of saving and sharing seed, 3) erode availability of locally-adapted plant genetic resources and, 4) threaten food security and sovereignty.
SUSTAINABILITY

Kasisi Agricultural Training Centre relies heavily upon donations and outside funding to pay its core staff of 24 and to implement many of its projects. It generates some income through its training programs and production units and is exploring ways to expand and strengthen its revenue stream from trainings, production units and, possibly, consultations. KATC keeps a small herd of 35 dairy cows on site and has begun selling the milk to a local milk processor. Plans are underway to expand the dairy and sheep herds. KATC also plans to gain additional revenue by doubling its on-site farm from 130 to 230 hectares and by selling the produce (mostly wheat, barley, oats, soy beans and seed maize). The Kasisi Agricultural Training Centre is also exploring the possibility of becoming a tertiary-level educational institution that would offer a professional degree in organic agriculture, a step that would yield additional revenue.

REPLICATION

Many countries lack a sufficiently robust agricultural extension service to assist small-scale farmers. Therefore, replicating the Kasisi Agricultural Training Centre model in other areas of the globe would be highly beneficial. To date, two KATC ex-trainees have established their own training centers to promote sustainable agriculture. Factors which may limit its replication in other regions include limited start-up funds and lack of local expertise in sustainable organic agriculture.

One way in which Kasisi Agricultural Training Centre is replicating its on-site trainings is through the use of study circles. Study circles are village-level participatory adult learning programs run by the local farmers themselves. A study circle leader, trained by KATC, acts as a facilitator for seven to twelve of his or her neighbors as they collaboratively work through a manual addressing a specific topic. The manuals are simple to understand and contain illustrations as well as practical exercises that the farmers can undertake. To date, KATC has produced several study circle manuals, including: small earth dam construction, sustainable agriculture, agroforestry, organic vegetable production, manure handling and storage, beekeeping, entrepreneurship and organic cotton production.

PARTNERS

Kasisi Agricultural Training Centre has partnered with a number of institutions over its 40 years of operation. Most recently, the Scottish Government and the Scottish Catholic International Aid Fund funded two projects with Kasisi Agricultural Training Centre - the Promotion of Rural Food Security Programme and the Kulima Programme. An international NGO, Hivos, is supporting the Chonge Green Society Project, an initiative to restore degraded lands through green technologies such as sustainable agriculture, agroforestry, dairying and renewable energy. In the implementation of the Chongwe Green Society Project, Kasisi Agricultural Training Centre has partnered with the Dairy Association of Zambia and the Micro Banker’s Trust. The Canadian International Development Agency (CIDA) funded a conversion to organic farming initiative for 100 small-scale farmers in Chongwe District, channeling funds through Canadian Jesuits International (CJI), which provided matching funds. The Global Environment Fund (GEF) funded the Chongwe Agroforestry Project, which restored degraded lands, improved food security and provided income opportunities for farmers. The Norwegian NGO Utviklingsfondet supported the Food Security and Community-Based Agro Biodiversity Project (2010-2014), while the Norwegian investment company Incluvest, working directly with Chongwe Organic Producers and Processors Association (CHOPPA), funded an initiative to improve small-scale farmer business profitability by facilitating and strengthening linkages between farmers and markets. Kasisi Agricultural Training Centre collaborated with the Swedish Cooperative Centre's (now We Effect) Southern Africa office to produce an agroforestry manual for sub-Saharan Africa. The United Nation’s Food and Agriculture Organization (FAO) assisted with the development and production of several study circle manuals. Zambia’s Ministry of Agriculture and Livestock is a close governmental partner. Founded by the Jesuits in 1974, the Kasisi Agricultural Training Centre has received monetary assistance and technical expertise from various Jesuit groups worldwide.
FURTHER REFERENCE

- Kasisi Agricultural Training Centre website
- “The art of mimicking nature”
- Br. Paul Desmarais SJ shares his work experiences

PROJECT PARTNERS

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UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in 177 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations.

The Equator Initiative brings together the United Nations, governments, civil society, businesses and grassroots organizations to recognize and advance local sustainable development solutions for people, nature and resilient communities.

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