

# HISTORY OF THE MONTEVERDE INSTITUTE (8-2019)

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The Monteverde Institute (MVI), a non-profit educational organization, was founded in 1986 in the mountainous northwestern Costa Rican community of Monteverde. In partnership with universities and schools primarily from the United States, MVI has provided courses and workshops in tropical and conservation biology, conservation, sustainability, agroecology, permaculture and organic gardening, community public health, globalization, ecotourism, social justice, architecture and landscape architecture, sustainable development planning, education, journalism, and Spanish language and Costa Rican culture. MVI also has facilitated research and service learning with increasing community engagement and has offered many community programs that benefit the local area and promote sustainable development (see YouTube, Monteverde Institute Mar. 3, 2014, Oct. 27, 2014, and Mar. 23, 2016).

## Origins and Development

According to the late John Trostle (1925-2015), one of the founders of MVI, the Institute's oldest roots lay in biology classes at the Friend's School from the 1950s, a growing "love of nature" among those Quaker families who welcomed biological researchers, and the visits of graduate tropical biology courses run by

the Organization for Tropical Studies (OTS) (Trostle 1990-91). Starting in the late 1960s, an increasing number of biologists conducted extensive research on aspects of the area's high biodiversity.

One Monteverde researcher, Nalini Nadkarni, who had taken an OTS course and who was teaching at the University of California, Santa Barbara, was interested in bringing an undergraduate course and team teaching it with her husband, biologist Jack Longino. They talked with John Trostle, who had spent twenty years as Associate Director of the Council on International Educational Exchange (CIEE, then based in New York) before retiring to Monteverde. He had worked with the faculty (Bill Allaway and Henry Weaver) in charge of the University of California Education Abroad Program (UCEAP); in 1986, UCEAP asked for courses in tropical biology and agroecology. Trostle, Nadkarni, Longino, and Barbara Haber became involved in discussions with Monteverde residents, some of whom were concerned about the possible negative impacts of a group of U.S. undergraduates living and studying in the community. Trostle said "the community had begun to realize that while tourism cannot be controlled, it is sometimes possible to guide components of it in creative educational ways. We might guide college groups into longer term high-quality educational programs, and by so doing, develop new jobs and careers for area residents, as well as create educational and cultural activities for the zone" (Trostle 1990-91).

In 1986, twenty-eight residents of Monteverde, most originally from the US, founded the non-profit "Asociación Instituto de Monteverde" in accordance with the Costa Rican Law of Associations of 1939. That law and subsequent revisions required certain administrative structures and legal reporting mechanisms that continue to shape MVI. The organization must have a Constitution and By-Laws and a General Assembly that meets regularly once a year; the 28 founders formed the original Assembly. Additional members have been elected. The Assembly elects a Board, consisting of a President, Vice-

President, Secretary, and Treasurer, one or more Members-at-Large (Vocals), and sometimes an Alternate (Suplente). The Board in turn selects the Executive Director who hires and manages the rest of the staff. Minutes (Actas) of the Assembly and Board meetings must be entered (in Spanish) in special legal books and in the National Registry. An additional elected official, a Fiscal, is a kind of overseer responsible for certifying that the Assembly and the Board have carried out all their legal responsibilities and have followed the organization's constitution, bylaws, and mission.

The founders drew up a constitution listing the aims of MVI which included: "A) promote education, culture, and scientific investigation in the areas of biology and agriculture; B) organize musical and dramatic presentations, as well as congresses, symposia, conferences, courses, and talks, on cultural, educational, or scientific themes" (Constitution of the Monteverde Institute 1986). MVI began to expand its focus in 1990, first developing a Mission statement that reflected Quaker values: "The Monteverde Institute is a non-profit association dedicated to peace, justice, knowledge, and the vision of a sustainable future...." In 1993, as the Monteverde area experienced rapid social, economic, and demographic change due to the growth of tourism and as global concerns shifted to "Sustainable development," MVI broadened its objectives to stress "Education for a Sustainable Future" (Bylaws 1993).

As MVI approached its 20th Anniversary, the Board and other MVI supporters became concerned about the scope of the mission, a growing financial debt burden from the construction of its new building and library addition, and from land acquisition. Debt went up while income from courses decreased, due partly to the impact of the 9/11 attacks; the Iraqi war; and increased competition from other study abroad programs. Beginning in 2006, MVI's Director, working closely with the Board, instituted drastic reductions in expenses through major personnel cuts, sale or divestment of some properties, and expanded efforts to increase income and find new partnerships for offering courses on a regular

basis. The Director, Board, and General Assembly evaluated scenarios (including grim ones) for MVI's future and, in 2007, launched a close evaluation of MVI's vision and mission. The leaner, more focused MVI paid off its debts by 2008 and successfully began expansion of its financial base (with more courses and students) and extension of its community outreach (see MVI Assembly Reports since 2005).

A much stronger, yet still financially prudent, MVI celebrated its 25th Anniversary in 2011, offering a vision of "a sustainable community for a sustainable world." MVI emphasized a mission "to advance sustainable living at the local and global level through place-based education, applied research, and collaborative community programs" ([www.monteverde-institute.org](http://www.monteverde-institute.org)). The Anniversary began with a Founders' Circle Celebration. The following months saw events celebrating the Arts, the Library, a Peace Day (jointly with the University of Peace), Home Stay families, and past staff members (Ortiz, 2011, 2012). For the 30th Anniversary (2016), MVI's staff organized displays and activities to familiarize Assembly members with all the Institute's programs and campus infrastructure developments.

MVI Director Nat Scrimshaw helped establish the Alliance for the Monteverde Institute (AMVI) in 1993 in Vermont to promote and support the Institute and other Monteverde organizations. In 1994, the IRS approved AMVI as a 501(c)3 non-profit organization that could receive tax-deductible contributions. The organization became dormant in 2005, but interest from a new Director and friends of MVI led to AMVI's reactivation in 2009. One of AMVI's Board members, Bob Howe, started an illustrated electronic Newsletter with information about the latest developments at MVI. Newsletters, bilingual since 2014, are sent regularly to Alumni and supporters (current and back issues are available on MVI's website); MVI has now taken the lead in producing the Newsletters. MVI's Director regularly participates in AMVI's monthly conference

calls; the Boards of AMVI and MVI have begun sharing Minutes and held their first annual joint meeting (via Skype) in 2016.

### **Academic Programs**

Monteverde and the areas around it offer many resources, study opportunities, and cultural exchanges for students that have contributed to the richness of place-based educational experiences (see Nadkarni and Wheelwright 2000, L. Guindon, et al. 2001, Burlingame 2000 and 2018). MVI has provided more than 600 courses (long and short) for more than 11,000 students from its founding to the end of 2018 (F. Lindau (Messerli), E. Coghi, D. Santamaría, pers. comm.). Courses have included semester/quarter programs for undergraduate and graduate credit; shorter university level courses for students and for faculty from Costa Rica, the U.S., Canada, and Europe on a wide variety of topics; and shorter programs for high schools, conservation groups, and service-based groups. In 2018, long courses made up 69% of total student days (Assembly Reports 2018). “Each of the 473 students that participated in the academic programs in 2018 worked in either a research or community program, and many participated in both” (Hamilton 2019). The variety of course topics, institutions, and numbers of students coming for courses can be traced through annual course calendar spread sheets (Calendario de cursos) and Assembly Reports. Internships for college credit have been available for many years. In addition to courses in Spanish and Costa Rican culture offered to course participants, in 2007, MVI added intensive freestanding Spanish instruction that included some local environmental and community development material; students of any age could sign up for one or more weeks. MVI has collaborated with partner institutions to offer customized services ranging from providing all instruction by its well-trained faculty, field trips, logistics, housing, and meals to fewer comprehensive arrangements.

The first Nadkarni/Longino quarter-long University of California Education Abroad Program (UCEAP) began at MVI in 1987. Since 1992, two

quarter-long UCEAP programs have been offered every year. Tropical biology remains the central focus of the program, coordinated for more than twenty-five years by resident biologist Frank Joyce. By 1995, Joyce made conservation biology (theories and practices) an essential part of the program to reflect the growing international importance of this new field (F. Joyce, pers. comm.); the name of the course was changed to Tropical Biology and Conservation. Courses in Tropical Diversity and Tropical Community Ecology given by Joyce, MVI faculty, and resident or visiting researchers include many field projects, which take place primarily in the Monteverde Zone but include field trips to contrasting ecosystems in the country. A third course, taught by local biologists and farmers introduces students to agroecology, tropical farming, land-use practices, sustainable agriculture, conservation practices, and, more recently, ecotourism. A course in Spanish (for biologists) and local culture, taught by degreed faculty and local native Spanish-speaking instructors, and homestays with local Costa Rican families are included in the program. The final course is an independent study project based on fieldwork. At the completion of this project, each student makes an oral presentation in a widely publicized session at MVI that is open to the community (UCEAP 2018). UCEAP's format is used for other semester/quarter long biology programs that receive college credit in the USA. It has also been adapted for many customized shorter courses at MVI (generally 1-3 weeks).

In keeping with its broader mission, MVI launched a 9-10 week intensive summer course, Sustainable Futures, in 1993 for upper level undergraduate and graduate students in architecture, landscape architecture and planning with SUNY-Buffalo and the University of Maryland (subsequently joined by other partner universities). Through “service learning” students have developed their knowledge and skills as they work (gratis) on planning and designing projects that help local communities and institutions (see Community Programs section

below). SF programs have also provided designs for MVI's main building and additions, outdoor classrooms, and campus landscaping.

Other links to MVI's mission and provision of benefits to local communities have come from several new "long" courses. From 2001 to 2015, a partnership between MVI and the University of South Florida produced a program called Globalization and Community Health Field School (course title and duration have varied). Students were trained in quantitative and qualitative research techniques, experimental design, and data analysis as they studied a number of health related issues in the Monteverde area, including: women and adolescent access to healthcare from prenatal through birth services; sexually transmitted diseases; tobacco use in adolescents; occupational dangers for agricultural workers; obesity, nutrition and food security; and access to clean water and dangers from untreated grey and black water. Students applied their knowledge each year to projects on MVI's campus and in surrounding communities (Assembly Reports 2014, 2015).

A new spring semester-long interdisciplinary place-based program for undergraduates, Globalization, Development, and the Environment (course title has varied) began in Spring 2009 as a joint program between Goucher and Mount Holyoke Colleges. The program studies the rapid changes in the Monteverde area, where tourism has been replacing traditional agriculture, as a way to understand the broader complexity of globalization and changing threats to sustainability in Costa Rica and beyond. Students spend most of their time studying and doing applied research in the Monteverde area where they live with local families. They also go on field trips and travel to several other locations in Costa Rica and neighboring countries. Students take four courses: Development and Social Change in Costa Rica, Environmental Sustainability, and Spanish Language and Culture plus one of the following electives: Topics in the Social Sciences (in Spring 2017, the topic was Gender, Health, and Development in Costa Rica and the Tropics) or Field Methods in Tropical

Ecology. They must complete an independent research project as part of their elective course and give a public presentation of their findings at the end of the semester. Students have been very enthusiastic about their experiences ("My semester in Monteverde changed my life and I'll never forget it or any of the people I shared it with. ... I'd recommend this program for anyone who values community, loves hands-on-learning, and cares about the world we live in"); several students have stayed on as volunteers or interns ([www.mtholyoke.edu/global/study\\_abroad/mhc-costarica](http://www.mtholyoke.edu/global/study_abroad/mhc-costarica); see also MVI YouTube site, Fig Tree Top Report, June 1, 2015).

2017 saw the beginning of a new long summer program with DukeEngage, a special program started at Duke University in 2007 that has enlisted thousands of students in community engagement or service learning all over the world. Students are fully funded by grants from the Duke Endowment and the Bill and Melinda Gates Foundation. The Monteverde program, under the direction of Deedra McClearn and Deb Hamilton, focused on "habitat and water resource restoration in the Bellbird Biological Corridor" [see below] (<https://dukeengage.duke.edu/wp-content/uploads/2017/02/costa-rica-2017.originalpdf>). In 2017 and 2018, students worked with residents of the Corridor and were involved in research and practical aspects of reforestation

A graph of the "History of Courses-MVI- 1988-2016" in the 2016 General Assembly Reports shows a dramatic growth in the number of students in the first six years as UCEAP added a second semester in 1992. The two UCEAP courses per year have consistently had the largest number of students; they draw students from all the University of California campuses. The Council on International Educational Exchange (CIEE) began offering a summer quarter through MVI in 1989 and added two semester programs in 1996 (A. Masters, K. Masters, pers. comm.). CIEE separated from MVI in 1999 and became an independent program in Monteverde, but its students' papers continue to be filed in MVI's library where they form part of its digital Tropical Ecology

collection. There have been some other long courses that are no longer offered; since 1999, there have been more short courses and fewer total numbers of student days. Most years had a mixture of longer and shorter courses totaling 20 to 25 courses per year. International events produced decreases in the number of courses and students. In addition to the impact of 9/11 and the Iraqi war previously noted, the worldwide financial crisis that started in 2007/2008 had a significant impact on student numbers. Hard recruiting work and improvements at MVI plus positive global economic and political developments produced dramatic increases in the number of courses and students starting in 2010. Also, as drug related violence increased in Mexico, more international students chose peaceful Costa Rica, which became the Latin American country of choice for US study abroad students. There was some decrease in the number of students in 2015-16 because of fear of the Zika virus, but an increase in 2018, partly because political turmoil in Nicaragua made it less appealing. During calendar year 2018, there were 33 courses, a total student enrollment almost twice that of 2007, and more student course days (more students in long courses staying more days) (MVI Calendario de cursos through 2018; Institute of International Education 2014).

For many years, internships (some for academic credit) and volunteer activities grew out of students' academic experiences at MVI. They wanted to stay after their courses ended to do research or be involved in a service project on MVI's campus or in surrounding communities. In 2012, MVI worked with Lake Forest College to create an annual long-course hybrid of supervised internships and Costa Rican cultural immersion for four undergraduates and a few new graduates. The Grace E. Groner Foundation funds this service-learning program (F. Perkins, pers. comm.; [graceelizabethgronerfoundation.com](http://graceelizabethgronerfoundation.com)). External funding from the Mount Holyoke College Global/Local Fellowship Program also supported two student service-learning summer internships in 2017 after the students finished their Goucher/Mount Holyoke semester program (L. Moreno,

pers. comm.). Many US students are now looking specifically for internships; starting in 2013, MVI expanded its internship offering considerably and publicized these through a new long detailed section on its web site. MVI staff and resident experts supervise the internships. MVI also started to recruit students by distributing posters publicizing internship opportunities and by visiting some of the campuses where MVI had contacts.

In 2014, MVI developed detailed policies and protocols to deal with emergencies. This was initially in response to an assault on a student the previous year; MVI worked with Costa Rican lawyers and its major academic partners in the development of these policies (see Annual Report 2014). The following year, MVI added prevention policies to keep students from acquiring Zika when they were on field trips in lower elevation areas where the virus was present (the mosquitoes carrying the virus do not live in Monteverde's higher elevation). By 2015, protocols covered every conceivable type of emergency; protocols are updated as needed ([Monteverde-institute.org](http://Monteverde-institute.org)> Study Abroad >Protocols).

### **Facilities and Campus**

During its first decade, the Institute occupied a series of small offices in the first Coop building, the Boehm House (the oldest structure in Monteverde), and the Sunset House. In 1997, a new headquarters embodying principles of sustainable design was built on land purchased adjacent to the dairy plant in the center of Monteverde. Architectural design of the original building was done by local architect Olman Quesada with ongoing support from Sustainable Futures courses (1993 to 1997), managed by Robert Shibley, one of the cofounders of the Sustainable Futures program. The other SF cofounder, Lynda Schneekloth, worked with Sustainable Futures students in the original landscape design for the campus. MVI's Board and staff were deeply involved in the entire process (L. Schneekloth, pers. comm.). The building was designed as a "model of sustainable building practices, serving as a teaching tool on the topic" (MVI

Annual Report 1997). Very little wood was employed in the building's construction; no wood from endangered species was used (as was common in other construction in the area). Instead, builders used concrete blocks, poured concrete, and steel roof framing; the roof was galvanized and painted sheet metal (Shannon 2007). Building design maximized natural light during the day; passive solar energy for heating and drying; and natural ventilation for cooling. Energy conservation has been a priority. Plans were to eliminate water run-off from the property; rainwater from the roof was to be collected in cisterns, used to flush toilets, and captured in a modern septic system. Greywater was to be cleaned in a reedbed/biogarden system. These features have not always worked as planned; for example, the biogarden has needed reconstruction several times, most recently by University of South Florida students in 2014; an intern then added interpretative signs to explain how the biogarden functions. Students in the SF, University of South Florida, and Goucher/Mount Holyoke programs cooperated to design and build a new demonstration water conservation project, an outside dry composting toilet, in 2015 (J. Peña, pers. comm., MVI Newsletters 2014, 2015).

In 2002, a new wing was added to the main building; its central focus is the John and Doris Campbell Library with its extensive collection of books, reprints, and digital resources, including student papers from MVI courses, for use by students, local and visiting researchers, and the broader community. The library also has a computer lab with a dozen computers, Internet access (which has been provided in various ways), high-speed wireless connections for the whole building, a variety of printers, and other electronic equipment. MVI's library houses more than 6000 physical items, including many article reprints; MVI's Library Coordinator has been entering paper records for these items into an Online Library Catalogue. She and a returning volunteer librarian began entering records for books and articles held at the Monteverde Cloud Forest Preserve in 2012 and hopes to add holdings from other local institutions to

produce a regional library catalogue (M. Leitón, pers. comm.). In 2007, a visiting librarian from the University of Vermont began to implement a new vision of the Library as the resource center for the area (Kutner 2012). She designed a new library page on the MVI website with links for English and Spanish speaking researchers to search engines such as *Google Scholar*, English and Spanish databases, bibliographies, and the growing number of free public access electronic journals (including the *Directory of Open Access Journals*). Kutner (2018) stresses the importance of these open access journals for equity among researchers, especially those in Latin America who do not have access to expensive subscription journals. Several US universities have been supporting the development of MVI's Digital Library Project that contains course research reports on Community Health, Sustainable Futures, and Tropical Ecology. This research was primarily conducted by students in MVI and in Monteverde's CIEE (Council on International Education Exchange) courses (L. Kutner, pers. comm.); the full text of these digitized papers is searchable online. Study abroad students at MVI have password-protected access to all the journals subscribed to by their home college/university library. The Digital Collection also provides free access to MVI's climate data and GIS maps and data for the area. "As the MVI Library's digital presence continues to grow, the important supporting role of the library for researchers in the area and beyond is becoming more widely known, and, most importantly, there is steady increased usage of the library's varied and growing resources" (L. Kutner, pers. comm.; see her 2010 article and MVI Newsletter articles in 7/15 and 7/16).

In 2015, MVI held a celebration for the Internet launch of the English and newly translated Spanish versions of *Monteverde: Ecology and Conservation of a Tropical Cloud Forest* (edited by Nadkarni and Wheelwright 2000 with chapter updates from 2014 and, subsequently, some from 2018). This work, the major source on the extensive natural science (and some social science) research done in the region, is linked and accessible from the library's page on MVI's website.

MVI's own website ([www.monteverde-institute.org](http://www.monteverde-institute.org)) has undergone numerous revisions over the years to reflect changes at the Institute as well as in the Internet. The website has easy to navigate drop-down menus with information and photos on all aspects of MVI. The site includes links to MVI's Newsletters, Blogs, Facebook page (including videos), YouTube videos (Fig Tree Top Reports), and a Twitter account.

The MVI building also has classrooms (of various sizes), offices; a laboratory (expanded and newly equipped in 2014); an auditorium; a new roofed back porch eating, study, and meeting area; a reactivated weather station; and carefully landscaped surroundings that feature native plants. In 2002, the Fox Maple School of Traditional Building (from Maine) constructed a small building behind the Library wing using 18th century timber framing techniques (and wood from non-native trees on MVI's property). This building, called Fox Maple, was first converted from a storehouse to a studio/classroom space; in 2018, another classroom was created on the second floor. It was tied in more with the main building in 2015 via a new patio entry and stonework matching the two outside staircases.

As the number of students, courses, and MVI personnel increased, MVI needed more classrooms and office space. Students from the Sustainable Futures (SF) Program developed concept designs in 2011 for a new wing and landscaping on the west side of the main building; the new wing was to be the most environmentally friendly building in Monteverde. This project was put on hold in January 2012, pending completion of the leadership transition and the raising of additional funds to pay for the building. Construction of a less expensive and smaller new outside timber-framed, multi-functional, glass-enclosed classroom, laid stone retaining wall, and entrance steps went ahead in the spring and summer of 2012 as a collaborative project among local artisans and volunteers, and students in MVI programs, including SF and Goucher/Mount Holyoke. Timber for the building came from MVI's non-native trees; one wall was made

from recycled glass bottles (see Newsletter of 2/13 and MVI's website and Facebook page for photos of the new classroom). This striking and instantly popular new outdoor classroom, the remodeled Fox Maple, and the larger laboratory took some pressure off the immediate need for classrooms and meeting spaces. In 2016, MVI relocated and expanded the kitchen, making it possible to provide many more meals, and then created a Spanish Program office in the old kitchen space. The Reception area was remodeled in 2019. The death of MVI founder John Trostle and others who had played a significant role in MVI's history led to the creation of a kind of zen space on the hillside above the outdoor classroom. Dedicated at the 2016 Assembly, the space has a low stonewall where people can sit "to meditate, remember, recall, and honor those who generously made valuable contributions to this institution, allowing it to celebrate 30 years of life" (MVI Blog, 11/16; has photos).

Gifts of land, a house and other buildings by a local family (the Cressons) totaling 16 ha and the purchase (in 2000, with substantial aid from the late Rachel and Dwight Crandell) of a 14 ha reserve with primary and secondary forest and trails above the main building enlarged the campus. To retire part of MVI's debt, 7 ha of this land was sold in 2009 to the Costa Rican Conservation Foundation (Fundación Conservacionista Costarricense or FCC), which guaranteed its protection through a reciprocal conservation easement between the two organizations; the sale left MVI with a campus of 24 ha (D. Hamilton, pers. comm.). In 2011, MVI and FCC began joint ownership and management of the newly created 14 ha Dwight and Rachel Crandell Memorial Reserve above MVI's campus. This Reserve has been the site of research projects, for example one monitoring bats and another (MoSI) monitoring survival rates of Neotropical migrant land-birds (D. Hamilton, pers. comm.). In 2016, a Lake Forest intern made signs for the trails and built a new entrance gate with a map and other information. The following year, another intern developed trail interpretations for the Reserve; in 2018, yet another intern worked on a landscaping master plan

featuring native plants for MVI's campus, including the path to the Reserve. The Crandell Reserve borders the 28,027 ha of privately protected forest reserves known as the Monteverde Reserve Complex. The conservation corridor that comes from the protected land above MVI continues below it with the Monteverde Conservation League's Bajo del Tigre reserve.

In 2013, students and volunteers developed new demonstration teaching gardens behind MVI's main building, including a vegetable and herb garden (used by MVI's kitchen), a medicinal plant garden, keyhole gardens (designed for dry season weather), rain gardens (to absorb rain runoff from the Fox Maple roof), a greenhouse for raising native plants, and a native tree nursery that produces seedlings for reforestation. A donor funded (in 2019) a large new greenhouse that will greatly expand seedling production. Native plants and tree saplings have been used on MVI's campus and donated to local people and organizations interested in planting them, especially in the Bellbird Biological Corridor. The gardens are used for experiments with different sustainable agricultural techniques (including the elimination of invasive species). They also provide educational opportunities for MVI students, staff, homestay families, and other local residents. In 2015, students constructed demonstration table gardens that were smaller, simpler, and cheaper than keyhole gardens but still at waist height and better for people with small yards and/or disabilities. MVI's gardens have served as models for gardens in several community locations (MVI Newsletter: 8/13, 6/14, 12/14). Volunteers have tagged trees behind the main MVI building as a first step to establishing an arboretum and calculating carbon dioxide sequestration rates in secondary forests (D. Hamilton, pers. comm.). Beds of native plants flank the main rebuilt (2014) entrance steps up from the road. Native plants are the focus of the New Forest Park in a strip between MVI and the road. The property, belonging to an MVI neighbor, had many large non-native trees, which were cut for lumber to construct the new Quaker Meeting House. Willow Zuchowski, founder of MVI's affiliate, ProNativas, started this

memorial garden in 2015 for her late friend and collaborator, Turid Forsyth. A path through the garden serves as another entry point to MVI from the main road. In 2017, two student interns from CIEE created interpretative signs and a table and seats; more native plants are being added (W. Zuchowski, pers. comm.).

Sustainable construction has been joined by sustainable practice at MVI (detailed on MVI's website under "Our Commitment to Sustainability"). As noted above, greywater is treated and reused on campus, and measures have been put in place to limit water runoff from the campus. Food scraps and yard waste have been composted on site; paper is reused as much as possible before recycling. MVI has played an active role in developing community-wide programs to deal with recycling and solid waste disposal as well as grey and black water problems. MVI has also worked with homestay host families to help them develop more sustainable practices.

In 2014 MVI decided that it would become carbon neutral. Several MVI employees took part in a 2015 workshop run by EARTH University to learn how "to measure an organization's carbon footprint" (Assembly Reports 2016). MVI staff, students, and interns have made extensive campus measurements of the elements responsible for MVI's carbon footprint. MVI found more ways to conserve electricity and to decrease its fossil fuel use for transportation. In 2019, MVI added 34 rooftop solar panels on the main roof over the Library wing and purchased a rechargeable electric cart for local errands. They also joined with the Fundación Conservacionista Costarricense in large-scale reforestation efforts using native species (see below). MVI started (2016) offering carbon offset certificates in return for donations funding the planting of 10 trees to compensate for the carbon emissions produced by one's trip to Costa Rica (D. Hamilton, F. Burgos, pers. comm.; Assembly Reports 2016).

Students in MVI courses lived and had classes in Monteverde Cloud Forest Preserve's main building and in local pensiones and hotels until 1991, when

some longer courses moved to the Biological Station, built by Canadian entomologist Monty Woods near Monteverde. The building contains sleeping and dining facilities, laboratory and computer space; close to the building is a demonstration native plant garden and access to primary and secondary forest. In 2002, the Institute entered a long-term purchase arrangement for the field station at the Bellbird Conservation Center (La Calandria) and was given the 27 hectares of land surrounding it in the lower and drier area of Los Llanos. Although MVI ended its efforts to buy the field station in 2006 as part of cost cutting measures, the field station is still used for students in some courses and was the site of a major 2017-2018 research project by DukeEngage under the direction of MVI Director Deb Hamilton (D. Hamilton, pers. comm.).

MVI continues to arrange homestays from a pool of about 118 local families during portions of courses (J. Ugalde, pers. comm.). By 2018, nearly 2500 students had participated in homestays (Assembly Reports 2016-2018). Homestays provide important cultural exchanges as well as a significant income base for community members; for example, in fiscal year 2016-17, MVI paid homestay families more than \$80,000 (Assembly Report 2017). Students have been very enthusiastic about their homestay experiences and many think they learned as much from the homestay as from their courses (see 2016 YouTube video at Monteverde Institute Homestay).

### **Applied Research**

From the beginning, MVI has been interested in fostering, facilitating, and applying research in the Monteverde area; MVI's focus is evolving to stress "community engaged scholarship" (Hamilton 2019). MVI has been an active member of the Monteverde Research Advisory Commission (CAIM), "a multi-institutional entity organized to address local research-related issues" (MVI website). Research done by MVI's international students, interns, faculty, MVI staff, and resident and visiting researchers continues to be made available to other researchers and the community through publicized open presentations of

research findings and the collection of research papers in the library. MVI has also organized and sponsored many lectures, seminars, and workshops for students and the public (see announcements and posters on MVI's Facebook pages and Assembly reports).

Following the 1993 decision to focus MVI's mission on "Education for a Sustainable Future," the Institute made a concerted effort to promote more applied research that addressed community needs and concerns, launching an Applied Research and Community Development Program. This broad program was replaced by more focused ones linked to academic courses, beginning in 2008 with the Integrated Water Resources Program (IWRP). IWRP has tied applied research to community involvement with stakeholders and builds on long concerns in the Monteverde area over sustainable and non-sustainable use of water resources, water pollution, and MVI's history of work in public health and planning. The program also has components tied to education and community outreach, particularly through its Adopt-a-Stream Program, a citizen-science program started in 2009. MVI's director of this program, aided sometimes by interns, supervised stream monitoring via collection of biological and physical/chemical data and preparation of annual reports by students from the three main high schools (colegios). Donors have provided good equipment for the students to use in their measurements. Working in three watersheds, students have found significant pollution problems in certain lower elevations. For example, in 2016, students from the Sta. Elena high school group, Friends of the Environment (Amigos del Ambiente), found serious stream contamination from human waste leaking out of septic tanks in the densely populated town. Fortunately, this was not polluting drinking water that comes in its own pipes from springs and is treated with chlorine, but the polluted water was flowing to communities below (M. Guevara pers. comm., J. Welch, pers. comm., L. Moreno, pers. comm.). This data was important to the local commission studying problems of grey and black water. Following tropical storm Nate in October

2017, members of this Program monitored local streams' recovery from storm-caused disturbance.

Another applied research program, "The Impact of Economic Change on Food Habits and Nutritional Health in Monteverde, Costa Rica: Mixing Agriculture and Tourism," was carried out 2008-2011 with funding from the US National Science Foundation and collaboration with the University of South Florida in partnership with MVI staff and local communities. The project compared food security and health issues (such as diabetes, hypertension, and obesity) in two different communities using a total of 200 families. One community was involved in tourism and had an active commercial center (the Santa Elena area); the other community (San Luis, in the valley), had been primarily agricultural but in the previous 10 years had developed a mixed economy with some family members involved in tourism in the Monteverde/Santa Elena area. Data analysis suggested that as families increased their involvement in tourism, food insecurity and health problems increased. Santa Elena families employed in tourism no longer grew their own food, had less free time and physical activity than in agricultural households, were exposed to more junk food, had chosen less healthy food to eat, and were developing the health problems associated with the diet in more developed countries. San Luis families, however, still had some connections with their agricultural base and less exposure to junk food because they were farther away from it when they returned to their homes (J. Peña, pers. comm.; Himmelgreen, et al. 2006, 2012; Ruiz et al. 2014).

MVI staff members have also conducted and led applied and long-term research projects such as: experiments to discover best reforestation practices for tropical native tree species, a forest integrity study with students from DukeEngage comparing an area reforested 15 years earlier (La Calandria) with an older secondary forest, carbon dioxide sequestration in tropical trees, phenology and dietary preferences of the three-wattled bellbird, evidence for

song learning in bellbirds, lichens as bioindicators of pollution and climate change, and scientific and social studies of pollution in watersheds below Santa Elena (D. Hamilton, pers. comm.; Kroodsma, Hamilton, et al. 2013; Hamilton, et al. 2013; Hamilton, Singleton, et al. 2018). As part of an international network, D. Hamilton and L. Moreno monitor (since 2014) the Overwintering Survival of Neotropical Migrants for the Institute for Bird Populations, Point Reyes, California, in a project called MoSI (D. Hamilton, pers. comm.; birdpop.org). L. Moreno also started (2017) a bird monitoring project in the Santa Elena Reserve at the request of the Reserve's Director and involving the student group, Amigos del Ambiente. A 2016-2017 study by MVI staff, a research affiliate, and interns replicated "studies from the 1970s and 1990s ... to document bird community changes as a possible response to current climate change" (L. Moreno, pers. comm.). Three staff members collaborated in a study of the impacts of tropical storm Nate (Hamilton, Chinchilla, Zuñiga 2018). In 2017, a staff member researched participative communication related to social and environmental sustainability through a case study using MVI's interactions with the local community. She is now the Director of MVI's Community Programs and is implementing some of her recommendations to improve communications between MVI and the community (Avendaño 2017). Assembly members have also conducted research projects that benefit conservation. One study completed an aerial census and then GIS mapping of all the mature endangered wild avocado trees of the endemic *Ocotea monteverdensis*, whose fruits are so important for the endangered Three-wattled bellbird (R. Chinchilla, pers. comm.).

Research Associates, and Research Affiliates, and Interns have also carried out applied research in biology and social sciences. Since the main building was completed, the Institute has provided researchers, including those doing thesis research, with a base, help obtaining government research permits, library and laboratory facilities, GIS resources, local contacts, e-mail and Internet service, map plotters, computer printers, etc. in return for a small fee. Research

projects have included water quality monitoring programs; evaluation of health problems related to water, smoking, and solid waste management; experimentation with reedbeds for the treatment of greywater; biodigestors and sanitation; ways to prevent HIV/AIDS in the area; epiphytes as bioindicators of climate change; “Community based resilience and transformative strategies in response to climate change”; and a study of the evolution of institutions connected with environmental sustainability in Monteverde. In addition, MVI has hosted researchers in biology, ecology, and conservation biology who worked on such topics as bird and mammal mapping, bellbird conservation, plant physiology and climate change, freshwater crabs and leaf litter breakdown, and mammal conservation in Costa Rica. The Director's Report in the 2016 Assembly Report provides a partial list of research affiliates over the previous 30 years; annual updates appear in subsequent Assembly Reports.

### **Community Programs**

Once service-learning courses started in 1995, MVI developed more focused course-linked programs to promote community engagement (see Assembly Reports and Avendaño 2017 for details). Also, in keeping with the vision and mission of its founders, MVI has used proceeds from its international courses, donations, and grants to support a wide range of programs and projects that enhance education, well-being, environmental conservation/restoration, and sustainable development as well as culturally enriching activities in Monteverde and surrounding communities. MVI obtained Costa Rica's "utilidad pública" designation (a legal non-profit status) in 1995; they must submit an annual official accounting of their public usefulness. In fiscal year 2017-18, community programs received \$87,495 (Assembly Reports 2018).

The Institute and individual staff members have been actively involved with all the main conservation, educational, governmental, and health organizations, groups, and commissions in the area, as noted on MVI's website

under Community Resources (see also Assembly Reports, YouTube: Monteverde Institute, Centro de Iniciativas Comunitarias del Instituto Monteverde, July 25, 2015). In addition, MVI has undertaken major initiatives in cooperation with other educational/conservation organizations in the area.

MVI has offered many talks, symposia, workshops, concerts, and other events open to the community. These have been advertised regularly in posted flyers, and in more recent years, via e-mails, Facebook, Twitter, and Newsletters. From late 2013 to 2016, Radio Comunitaria Monteverde (an MVI affiliate), broadcast many MVI events live via Internet at [www.monteverde.fm](http://www.monteverde.fm); these are archived at [monteverde.fm.wordpress.com](http://monteverde.fm.wordpress.com). The Institute started its own live video streaming of events at MVI in 2015; these are archived by date on MVI's Facebook page under "Video." MVI also operates a free electronic community bulletin board in English and Spanish that publicizes upcoming events at MVI and in the community to those who sign up for the emails. A new role for MVI emerged in the wake of tropical storm Nate in October 2017, whose 520 mm of precipitation in 36 hours destroyed road access and cut electricity, water, and telephone services to Monteverde and surrounding communities. MVI became the community emergency center where people met to organize responses to the storm. The Institute has started to acquire equipment for use in a possible future emergency and to think about what kinds of additional training local people might need to help others (Cobb 2017, MVI Newsletter 10/17, Assembly Reports 2017, D. Hamilton, pers. comm.). Thanks to training offered at MVI, most of the Staff already has certification in Advanced Wilderness First Aid (WAFA); some of them are also certified as Wilderness First Responders (WFR) (Assembly Reports 2018).

An early contribution that benefited the community, MVI's Volunteer Center, was jointly established in 1990 with the Monteverde Conservation League to place hundreds of volunteers attracted to the Monteverde Zone in organizations and to arrange housing with Costa Rican families. Volunteers

contributed to local schools; helped the Monteverde Conservation League with tree nurseries and reforestation; maintained trails and staffed visitor's centers in the area's nature reserves; and helped other organizations. The Volunteer Center ended about 2000 as individual organizations, developed their own volunteer programs (Burlingame 2000).

MVI has welcomed local and international volunteers, particularly under a growing Internship program (see website for current internship opportunities). Volunteers and Interns have mainly worked on specific projects in conjunction with existing MVI Programs, staff research, courses, affiliated researchers, and requests from community organizations. Projects have included water quality monitoring, local water use and management policies, greywater treatment, GIS, medicinal gardens, native ornamental plant landscaping, advancing homestay sustainable development, promoting healthy lifestyles in selected Monteverde area schools, developing the Pacific Slope Trail (including promoting rural tourism along the trail), aiding people with special needs, studying sustainability in selected tourism businesses, and studying tropical forest restoration, carbon sequestration, and carbon offsets. As an example of a specific project, in 2009, MVI interns and former students collected all studies done by MVI students over the years on aspects of local coffee production. They obtained a grant, translated the research papers into Spanish, published them in an illustrated booklet, and distributed copies at a community event to all the farmers who had been involved in the studies (S. Ropp and M. Cohen-Price, editors, 2009). Other volunteers prepared a Spanish language booklet with nutritional information on vegetables and fruits available in the area. Still other volunteers have developed plans to improve family nutrition through demonstration community gardens at MVI and in several communities.

MVI's Community Outreach Program has worked extensively with a pool of more than 100 Homestay families from eight local communities (C. Rocha, pers. comm.). The Institute runs orientations, workshops that include nutrition

and dietary preferences, farewell meals at MVI, and special activities (such as computer and English language lessons in MVI's library) for homestay mothers. The Program tries to prepare these families and their MVI students to deal with "culture shock." MVI has also worked with homestay host families to help them improve nutrition, increase energy efficiency in their homes (which can save money), promote recycling and composting, and control water runoff.

In 2012, the Community Program reached out to a new group, local 12-15 year-olds, with a camp experience. Counselors aged 16-20 and adult volunteers from seven area communities helped the younger kids have fun, engage in community service, and "develop healthy and educational links between Monteverde's youth and its community members" (MVI webpage; E. Rockwell pers. comm.). Some of the campers became counselors the following years, providing the opportunity to develop leadership skills. The experiment was so popular and successful that it has become an annual event. In its 7 years, the camp experience has involved nearly 300 local teenagers (MVI Blog, Nov. 6, 2018). MVI would like to offer follow-up programs during the year to help meet the many needs of young people in the area, but it lacks the funds (see Avendaño 2017, Assembly Reports since 2012).

MVI launched an exciting new oral history program, Living Book, in 2016. The goal is "promoting the oral and cultural history of the different communities of the Monteverde Zone, as well as creating a space for learning about our community, its people and their history" (F. Burgos, pers. comm.). Each widely publicized session involves extensive conversations with one to three prominent people (primarily Costa Ricans) talking about their different historical experiences and contributions to the area with a moderator and members of the audience. Monteverde.fm broadcast them live; subsequently, MVI's live video program recorded them and then posted them on MVI's Facebook videos.

The Sustainable Futures (SF) program that began in 1995 was the first of the continuing service-learning courses. Its projects have included large-scale

"scenario planning," development plotting and tracking of the area since 1950, and alternative scenarios for the future (L. Schneekloth, pers. comm.). The Enlace Verde (Green Link) project of the late 1990s employed GIS mapping and worked to link privately held forests outside of the reserves through different conservation strategies. Most properties owned or formerly owned by MVI were protected by conservation easements as part of the larger Enlace Verde.

Responding to requests from local government, civic groups, and community non-profit organizations, SF also carried out projects to improve the quality of life. These ranged from the design and construction of wastewater treatment options to improving traffic flow through Santa Elena to the building of living walls (Assembly Reports 2016). Other projects addressed building and landscaping needs for local institutions, including public and private (non-profit) schools; the local Red Cross; the Monteverde Cloud Forest Preserve; the Monteverde Conservation League; the Santa Elena Reserve; a field station (Los Llanos); and construction and other projects with the Finca La Bella Cooperative Farm in San Luis. In 2016, SF worked with the San Luis Development Association to design and partially build a public recreational park, the first in the area. The following year, continuing a new focus on the use of public space, SF participated with the local government in another "design and build" recreational community park project in the nearby town of Los Llanos and designed a community park for Sta. Elena (A. Torres, pers. comm., Assembly Reports 2017). They designed (in 2018) a new office space in Santa Elena for the Monteverde Community Fund and the small public library as well as an art and music workshop addition for the Friends school (Assembly Reports 2018). SF students and several interns were also involved in planning for a Pacific Slope trail from Monteverde to the Pacific that would offer economic opportunities to small communities through rural tourism and advance environmental conservation by trying to establish a green corridor (see [senderopacifico.net](http://senderopacifico.net)). In 2016, SF produced one of the designs for a new field station that would be as

green as possible for the Pacific Slope Trail; the station opened in 2018 in San Luis (A. Torres, pers. comm.). Since 2007, SF has elaborated plans for "greenways" in the upper section of Monteverde down to the gas station and "sidewalks" from there into Sta. Elena. SF, Goucher/Mount Holyoke students, and other service-learning courses worked with the local district council to make safe walkways, benches and a scenic overlook at sunset vista points along the main road a reality (MVI Blog, 2/16; D. Hamilton, pers. comm.).

An example of SF's concern with water issues is their 2014 work with a local school (CEC or the Cloud Forest School) to analyze water use on the large campus and recommend ways to reduce water consumption. Subsequently, the school got a grant to build a pilot rain water collecting system to supply some of the toilets that were using large amounts of the school's potable water (C. Yang, pers. comm.). In 2016, SF began researching ways to improve housing design to manage the serious problem of storm water runoff; their study started with the houses of their homestay families (A. Torres, pers. comm.).

The Community Health Program that emerged in 2011 evolved from MVI's 1990s Family Life Program for disadvantaged women that focused on developing economic autonomy, self-esteem, and leadership; promoting literacy, nutrition and health; and preventing domestic violence and child abuse. MVI supported various small groups, organized workshops, and helped them to obtain assistance from local sources of support and to network with other organizations in Costa Rica. The Program expanded to include adolescents in 1996, addressing their needs including recreation and health issues (drug use prevention and sexually transmitted diseases). As part of this, the Sustainable Futures course surveyed "The Life of Youth in the Zone." Efforts to link community development programs with research and service in international courses were a priority under the mission of education for a sustainable future; the addition of international courses in public health tied in well. The University of South Florida has had the main service education program in this area.

Students did research on many health-related issues and assisted with free basic health screening, including eye tests, blood glucose checks, and blood pressure readings. The short nursing courses also provided some of these services (J. Peña, pers. comm.; Burlingame 2000).

As noted in the above section on Applied Research, researchers from the University of South Florida worked with MVI from 2008 to 2011 on an NSF funded study that found people in communities in transition away from an agricultural base had worse nutrition and increased health problems. Students from the University of South Florida experimented with different kinds of organic gardens that would produce healthy food cheaply without large time demands given the wet/dry cycles in the climate. The demonstration vegetable gardens were first installed on MVI's campus, but then some were built elsewhere, for example, in the lower, dryer, hotter San Luis valley. MVI also posted garden how-to manuals in 2014 on their Blog site. The course discovered drawbacks in the various demonstration gardens, so in 2015, they started to experiment with table gardens, which were cheaper, simpler, and faster to build, took up very little space, and (at one meter high) were easily accessible to adults, including those with disabilities. Use of composting and organic fertilizer made intensive local production of vegetables all year around possible. The tables were tested for a year on MVI's campus and with two community members; MVI continues to experiment with different types of table gardens. The following year, there was a "pilot program" with distribution of table gardens to ten MVI staff members and then 30 other families in the area. MVI is raising money to make more table gardens available for community members and spread information about the health benefits of improved nutrition (J. Peña, pers. comm., pers. comm., Assembly Reports 2017). New collaborative work with the Hotel Belmar in 2018 produced a series of free workshops on organic gardening and composting for home gardens by Belmar's expert on these (Assembly Report 2018).

The second aspect of a healthy lifestyle that MVI promoted was physical exercise. After the NSF grant ended in 2011, MVI formally established its Community Health Program and worked with focus groups to learn about their needs and desires for organized physical activity; Monteverde in Motion was born. Classes in zumba, yoga, and aerobics were held in several locations. The MVI Community Health Program director was trained by the University of South Florida professors to make biophysical measurements at the beginning and then as the program developed to monitor changes. The goal in the first year (2012-2013) was 100 participants; more than 2000 people from 12 neighborhoods signed up for classes in Santa Elena and San Luis (J. Peña, pers. comm.)! MVI paid most of the program expenses for several years; the Monteverde Community Fund provided a grant for support in the second year (2013-2014) that included training in leadership skills. For the program to be sustainable, participants would have to pay the instructors for what was not covered by insurance. It took intensive work to convince the Ministry of Health (whose rules governed businesses offering fitness programs) that the community program was focused on health and that therefore insurance should pay some costs for trainers who had been trained and certified by the government. By 2016, Monteverde in Motion was successfully standing on its own (J. Peña, pers. comm.). Two Monteverde interns carried out evaluations of the autonomous program and some challenges they were facing (Assembly Reports 2017). MVI continues to offer yoga and exercises for its staff and community on site. Several courses on health related topics and an intern worked in 2018 with a group of senior citizens and two schools in San Luis to promote good nutrition, physical activity (especially dancing at MVI for the senior citizens), and health education (Assembly Reports 2018). The third and newest aspect of the Community Health Program is Healthy Environments, which focuses on water resources and health problems from wastewater (see the discussion below on the Municipal Commission on Water Resource Management).

The Goucher/Mount Holyoke students have also carried out research and service projects that benefit surrounding communities. For example, in 2014 individual and group projects focused on different aspects of the insect-transmitted Chagas disease in the Monteverde area. Many in the area had assumed that no treatments were possible, but the students publicized treatments that existed for different stages of the disease. In 2016 and 2017, the group research project focused on: "Land Use and Conservation in the Monteverde Zone: Comparing Forest Fragment Health with Socioeconomic Statuses and Local Perceptions." They have installed benches at a vista point near the Cerro Plano sidewalk and worked to improve the La Calandria tree nursery for reforestation projects (Assembly Reports 2014-2018). In 2018 and 2019, they did group research projects on the rapid growth and impact of Airbnb rentals in Monteverde; by January 2019, there were 451 active listings in the area, a significant increase from about 300 the previous year. The students found that, while the rentals offered positive benefits to renters and provided extra income to the property owners, they sharply decreased the number of reasonably priced long-term rental units needed by teachers, researchers, and workers (GCMC 2018, 2019). In 2018, they also studied the impacts of tropical storm Nate on Monteverde. Their work was extended and developed by three MVI staff members who analyzed the impact of Nate on the landscape, habitat restoration, and the community in a poster presentation at the Ecological Society of America (Hamilton, Chinchilla, and Zuñiga 2018). In 2019, students in the Goucher/Mount Holyoke program also did two studies related to climate change with CORCLIMA (see below).

The DukeEngage Program constructed a rain garden for the Santa Elena high school in 2017 (Program blog: [dukeengage.duke.edu](http://dukeengage.duke.edu)). They have been very active in reforestation (see below) and, in 2018, built a new tree nursery to raise lowland species in the very southwestern part of the Bellbird Corridor for the Women's Development Association in Costa de Pajaros. (D. Hamilton, pers.

comm.; Assembly Reports 2018). Many short courses have contributed to specific projects benefitting local communities; for example, in 2017, one course built a biogarden to clean greywater at a local farm, and another one constructed two aerial wildlife road crossings; yet another one, repaired and built trails for the Sendero Pacifico (Assembly Reports 2017-2018, Newsletters).

MVI has been deeply involved with three large-scale, cooperative, conservation, research, education, and sustainable development projects that benefit the greater community. The first of these is the Three-wattled Bellbird Biological Corridor (BBC), which aims to connect the Monteverde Reserve Complex through three watersheds, two sub-watersheds, and 11 life zones down the Pacific slope to the Gulf of Nicoya (H. Villalobos, pers. comm.). Biological corridors to protect migrating species and promote genetic diversity have been a priority in conservation biology for some time and in Costa Rica since the early 1990s. Individual scientists and conservation organizations in the Monteverde Zone began researching altitudinal migrations in nearby areas of the Pacific slope starting in the mid-1990s and reforesting sections with native species of trees, especially trees producing food essential for such altitudinal migrants as the Three-wattled Bellbird and the Resplendent Quetzal and for neo-tropical migrants. Several of these organizations purchased Pacific slope land adjacent to or near protected forests of the Monteverde Reserve Complex and reforested degraded land in the area. In 2007, a local Council formed to move forward on making the corridor a reality. The seven founding members of the Three-Wattled Bellbird Biological Corridor were the main local conservation organizations: MVI, The Costa Rican Conservation Foundation, the Monteverde Conservation League, the Monteverde Cloud Forest Preserve-Tropical Science Center, the Santa Elena Reserve, the University of Georgia Costa Rica (in San Luis), and the Costa Rican Arenal-Tempisque Conservation Area or ACAT (see Burlingame 2000 and 2018 for more information on these organization). In 2009, these groups agreed to pay for a part-time Coordinator for the Project, and MVI

initially provided office space for this person. With funding from the GEF-Small Grants Program, they elaborated a Strategic Plan with a mission to reestablish and maintain: biological connectivity, conservation of natural resources, and the well-being of local communities (Corredor Biológico Pájaro Campana, Plan Estratégico 2011-2016). Implementation of the Plan has been funded by a grant from the UNDP Small Grants Program. By 2013, the Project had created a series of maps, using satellite images and GIS, of the physical, biological, and land-use features of the proposed corridor (R. Chinchilla, pers. comm.). They monitored bird populations along transects in the corridor as well as water abundance and quality. MVI interns, working with staff in Community Programs, created a map showing water springs and their existing forest cover throughout the corridor

Reforestation in the BBC has become a major focus for MVI. In 2016, MVI and the Fundación Conservacionista Costarricense (FCC) signed their first annual agreement to work together in reforestation efforts in the corridor. The FCC had been founded in 2002 to protect, connect, and restore “tropical habitats with a special emphasis on the deforested slope of Costa Rica [in] areas critical for the survival of the Three Wattled Bellbird (*Procnias tricarunculata*)” ([fccmonteverde.org](http://fccmonteverde.org)). Their main tree nursery was at La Calandria, and MVI had been expanding its tree nursery, assuring a supply of trees for reforestation. The two organizations then needed many volunteers to prepare, distribute, and plant native tree seedlings. MVI signed an agreement with National Geographic's G Adventure Travel Program in 2016 that provided 500 visitors/year to work in the tree nurseries and to donate money that supports reforestation. In 2016, MVI/FCC produced and distributed more than 12,000 "native tree seedlings to residents and water suppliers wishing to reforest abandoned pasture and water springs throughout the Bellbird Biological Corridor" (D. Hamilton, Assembly Report 2016). The DukeEngage program planted more than 3000 of the total 8000 native tree seedlings representing the 45 species that MVI programs planted in the corridor in 2017. In 2018, DukeEngage was responsible for more than 5000

of the 14,115 seedlings planted; they even planted trees on an island in the Gulf of Nicoya, but within the BBC (program blog: [dukeengage.duke.edu](http://dukeengage.duke.edu), Assembly Reports 2017, 2018). Reforestation efforts continued to focus on areas near springs, streams, and river and on planting a number of the critically endangered *Ocotea monteverdensis*, so important as a food source for threatened bellbirds and quetzals (Assembly Reports 2018). By 2018, MVI/FCC had distributed about 250,000 native tree seedlings representing more than 140 different native species to private land owners in the Corridor, who saw a number of benefits from participating in the reforestation program (D. Hamilton, pers. comm.; Hamilton 2019). Annual production of seedlings will increase, because in 2019, a donor funded the production of two new large greenhouses that will hold about 3000 seedlings (R. Chinchilla, pers. comm.). One greenhouse is on the MVI campus and the other at La Calandria, in the BBC, at a lower elevation than Monteverde to raise different species; fortunately, there are many groups participating in reforestation who can help with the expanded production and planting (D. Hamilton, pers. comm.; Assembly Reports 2018; for more detail, use Reforestation tab on MVI's website). DukeEngage carried out scientific studies in 2018 and 2019 on Forest Integrity at La Calandria, comparing an area there that was reforested 15 years earlier with older secondary forests. Their “results show that this young forest is functioning in many ways as that of a forest > 50 years old and is in the process of developing other characteristics of older forests” (Assembly Reports 2018).

There have also been numerous meetings with inhabitants of the corridor to educate them about the project and learn about their concerns, to point out benefits they could receive and to solicit their feedback and proposals for local projects. In 2017, communities bordering the lower western edge of the Corridor asked to join the BBC because they saw economic advantages, including the ability to receive Payments for Environmental Services from the government; addition of this area increased the size of the BBC to 88,456 ha from 66,000 ha (H.

Villalobos, pers. comm.). The promotion of rural tourism is an example of a project that offers economic benefits; it began in 2014 with a grant from the InterAmerican Foundation (R. Chinchilla, pers. comm.). Rural tourism is connected with the development of the Pacific Trail (Sendero Pacífico) that will eventually go within the corridor from Monteverde down to the Gulf of Nicoya. By 2018, five communities were involved, and an improved trail extended down to Guacimal, which is about 1/3 of the way to the Gulf. Plans include reforestation along the trail (senderopacifico.net). Several MVI courses and interns have worked on this Trail and rural tourism project.

The second major initiative, the Monteverde-Arenal Bioregion Initiative (MABI), was launched in 2014 at a conference at MVI. Its aim was to promote greater cooperation, communication, and synergies among stakeholders in conservation, sustainable development, research, and education (public and private) in the broader regional area (MABI 2014 and Burlingame 2018). A second MABI conference was held in 2015 at the University of Texas' Soltis Center near the eastern border of the League's Children's Eternal Rainforest and north of San Ramon, Costa Rica; it stressed "Global Challenges and Opportunities for Biodiversity Conservation" (MABI 2015). The third annual meeting, held at the University of Georgia's San Luis campus in 2016, focused on developing an on-line data-base of all research in the area (MABI 2016). A fourth MABI conference (in 2017) followed a different format and had three workshops. The first workshop, held in May 2017 at MVI, focused on the scientific basis of effective reforestation and featured talks by Deb Hamilton, Nalini Nadkarni, and Eladio Cruz. The second, in June in the lower part of the Corridor, stressed positive and negative experiences with reforestation. The third, held at UGA in San Luis in July, focused on ways to raise money and cooperate in reforestation projects in the Corridor (Assembly Reports 2017, MABI 2017). Although no MABI conference was planned for 2018, several successes continue from the Conferences. The most important has been improving communications and

contact among the various stakeholders. The most concrete result was the formation of the Biologists Group after the 2016 meeting. Each monthly meeting for the next two years at MVI featured a talk by a biologist on her/his research with discussion and sharing of research news; a new volunteer convener could reactive the Group (D. Hamilton, pers. comm.). Organizers of MABI envisioned a major on-line database of all research (including data sets), projects (including long-term monitoring), educational resources, etc. in the area; some information had been posted by 2018, but the project lacks funds and personnel (MABD 2018).

The third major initiative, completed in 2016, involves a somewhat smaller geographic area that lies within the MABI region. The 28,314 ha Arenal-Monteverde Protected Zone has been a legally recognized entity for decades. In late 2014, MVI was awarded a grant by Costa Rica por Siempre (Costa Rica Forever, an international non-profit funded by a debt-for-nature swap) to write a Management Plan for the Protected Zone for Costa Rica's SINAC (Sistema Nacional de Areas de Conservación--the National System of Conservation Areas). F. Burgos of MVI worked in consultation with all of the conservation organizations and numerous stakeholders in the Zone to develop the plan (MVI Newsletter 4/20/2015). The process had two very positive aspects: conservation organizations put a lot of energy into developing close working relationships that avoided historical tensions, and there are now 20 detailed GIS maps of multiple features for the whole area that are frequently used by local conservation and educational organizations (L. Stallcup, pers. comm.). "The major recommendations include the need for additional personnel for the monitoring of the protected zone, increased collaboration and coordination among the conservation partners, increased research and ecological monitoring, proactive measures to increase ecological resilience to anthropogenic challenges such as climate change, and the need for clear boundary determinations and their mapping" (F. Burgos, pers. comm., Assembly Report 2016). SINAC has

accepted and approved the Plan, which they posted on line (SINAC 2016); they have started implementing some of the suggestions (D. Hamilton, pers. comm.).

An important example of MVI's role in solving local problems was finding a way the community could deal with trash. There had been sporadic efforts at recycling by area hotels and the Monteverde Cloud Forest Preserve; most garbage was buried on site. In 2010, MVI joined with other local groups and the local government to create the Monteverde Commission for the Integrated Management of Solid Waste (known by its Spanish acronym, COMIRES) charged with developing plans to deal with the area's solid waste to comply with a nation-wide 2009 law. MVI provided technical and logistical support to COMIRES. The local government now runs regular garbage pick-ups, has built a large recycling collection center and some mini ones, and involved volunteers in monthly recycling pick-ups. MVI and other local non-profits and businesses all have recycling receptacles on site and publicize recycling. An estimated 40% of the total garbage trucked from Monteverde to the landfill in Miramar is organic waste. In 2018, J. Welch (formerly of MVI) began a COMIRES experimental pilot project to manage organic waste locally through a centralized composting system to produce environmentally friendly products (J. Welch, pers. comm., Burlingame 2018).

A second example of local problem solving was the creation of an official Commission out of a workshop at MVI in 2014 to deal with local concerns about water resources and problems of wastewater. MVI's Coordinator of Community Health Program has chaired the Commission; she was aided by the SF and GIS Coordinators. The Monteverde Special Commission for the Integrated Management of Water Resources is known by its Spanish acronym, CEGIREH. All the main public and private players related to water in the area are members of the Commission (Assembly Reports 2014, 2016, 2017). MVI has provided water-testing equipment and scientific expertise. Several local grants to MVI supported two major baseline research studies on the water quality and

management of greywater in the area. One study did scientific analyses of water quality using physical, chemical, and bioindicators that provided evidence of stream and water pollution. It also surveyed households to discover public knowledge of the problems and household cultural practices associated with greywater, much of which (especially in the Santa Elena downtown area) is polluted and currently goes into streams (Guevara and Bonila 2017). The second baseline study focused on knowledge and practices by businesses and public and private institutions (Welch 2017). In 2017, the Commission presented its findings to the local government and then to the general public. The following year, the Commission proposed an Integrated Wastewater Management Plan for the district, invited public comment, and began planning and searching for funds (J. Welsh, pers. comm., Burlingame 2018).

Building on growing local concern informed by global concern over climate change, in 2015, MVI hosted an intensive long workshop with several other Monteverde organizations given by Costa Rica's EARTH University to learn how organizations can achieve carbon neutrality certification according to rigorous international ISO standards (D. Hamilton, F. Perkins, pers. comm.; Brenes, et al. 2016). The workshop led to the formation of a new group in 2016, the Monteverde Commission for Resilience to Climate Change (whose Spanish acronym is CORCLIMA); in 2017, it became a special commission of the local government. Several members of MVI's staff are active members of CORCLIMA. This group's focus is on ways to mitigate and adapt to climate change that is already happening; they work with selected national and international groups. Their mission is to "unite efforts in Monteverde to lower emissions, capture carbon, and adapt to climate change" (CORCLIMA.org; see also Brenes, et al. 2016). CORCLIMA began baseline measurements in 2017-2018 to calculate emissions from all the main sources of greenhouse gases and the quantity of carbon Monteverde's forests fix (Brenes, et al. 2016, Assembly Reports 2016, 2017, Burlingame 2018). CORCLIMA has been working on reducing carbon emissions

from the transportation sector, a major source of greenhouse gases. MVI's Goucher/Mount Holyoke Program carried out two team research projects in 2019 to advance CORCLIMA's work. One studied traffic flow in the area to provide baseline data for CORCLIMA's transportation planning; the other surveyed a sample of Monteverde businesses on their vulnerability and adaptations to climate change (GCMHC 2019). MVI has hosted climate change lectures and workshops, such as Katy VanDusen's workshop on Climate Change (video on MVI's Facebook page, March 9, 2018) and has taken its own steps towards becoming carbon neutral.

A strong GIS program at MVI evolved from the needs of the above multi-institutional programs. Prior to 2014, MVI's GIS equipment was managed by "interns or temporary researchers, who during their stay in the area, elaborated projects requiring GIS analysis" (Assembly Reports 2016). The Corridor founders and grants provided funds to hire a trained GIS specialist, who was based at MVI and who made all the GIS maps for the Corridor project. This specialist became Coordinator of the Corridor Project in 2014; he remained at MVI when that Coordinator position rotated to the Cloud Forest Preserve in 2016 and became MVI's GIS Coordinator, the "go-to-guy for any geographic information that is needed" (General Assembly Reports 2016). He produced 20 GIS maps for the Management Plan for the Arenal-Monteverde Protected Zone and tracks the FCC/MVI project for reforestation of springs and riparian areas in the Corridor. He supports all GIS needs of MVI courses, programs, interns, and researchers. In addition, he is an MVI member of CEGIREH, supports CORCLIMA, and is in charge of preparing maps and GIS data for their work (see above). Such local organizations as the Clinic (part of the National Health system), the Monteverde Conservation League, and the Cloud Forest School (CEC) have also benefitted from his map making. In 2018, he posted many of his GIS maps and data in MVI's Library Digital Collection. Maps and data available for free public download show the area's roads, watersheds, infrastructure, land use, BBC,

historical changes, and other features (R. Chinchilla, pers. comm., Assembly Reports 2016- 2018).

From the time MVI was founded, it supported the Arts. The auditorium (constructed in 1997) provided space and a piano for larger performance groups, and MVI began hosting the annual multi-week Monteverde Music Festival. Net income from ticket sales was used to purchase instruments, sheet music, and recordings for use in the area and to support music classes for local schools and students of all ages. A Ceramics Center, built in 1995 in MVI's former house/office, Boehm House, was a cooperative project involving MVI, resident potters, and the women's crafts cooperative (CASEM); it offered classes and glazing/kiln facilities. In 2000, the Ceramic Center became part of a new larger Community Art Center featuring local artists. The house and its property (with an attached conservation easement) were sold by MVI in 2006 as part of the effort to decrease its debt. While MVI continued to host some art events, it decided that there were enough other facilities, people and groups in Monteverde concentrating on the arts and that MVI "should refocus its efforts on the three cornerstones of its mission: place-based education, applied research, and community engagement" (J. Wilkins, pers. comm.). However, since 2013, thanks to generous local donors and a more financially secure MVI, the Institute again has been hosting and/or sponsoring many concerts and the Music Festival as well as art exhibits, poetry festivals, and a story telling workshop. In an important new contribution to the arts, in 2015 MVI's Library welcomed the first permanent art collection of about 300 original paintings, prints, and illustrations by 16 local artists. Several of these artists had raised funds to commission a wooden cabinet to hold the art works; anyone may see and study them. Eventually these artists would like to have their own museum (MVI Newsletter, July 2015).

MVI has provided direct financial benefits for local people on MVI's staff through wages and government mandated benefits. They also pay families

offering homestays for MVI students, owners and employees of lodging and dining establishments, and other business services and providers of food, transportation, supplies, etc. In 2010, for example, MVI paid out more than \$350,000 to community service providers (Wilkins 2011); by 2018, payments of \$427,018 went to local providers (Assembly Reports 2018). These payments, in turn, flow back into the community, as does money spent by MVI's international faculty, students, and researchers. Some local residents have received individualized financial benefits such as scholarships to attend MVI courses, workshops, and events, and financial aid (for MVI employees) to continue their education.

A special kind of indirect financial benefit developed with MVI's 25th Anniversary. MVI and CREST (the Center for Responsible Travel) co-sponsored the 3rd International Travelers' Philanthropy Conference; 150 delegates from 20 countries met in San José and then Monteverde. Travelers' Philanthropy encourages travelers to give "financial resources and talent to further the wellbeing of local communities" ([www.Travelersphilanthropy.org/resources/conference-proceedings-2011.shtml](http://www.Travelersphilanthropy.org/resources/conference-proceedings-2011.shtml)). As Wilkins notes, if each of the about 240,000 people visiting Monteverde per year contributed a dollar, there would be a lot of money for community development. In the year's run-up to the conference, MVI helped launch a pilot destination-wide Monteverde Travelers' Philanthropy initiative "designed to equitably channel financial resources from the tourism sector for the benefit of the communities and natural environment of the Monteverde region" ([www.Travelersphilanthropy.org/resources/conference-proceedings-2011.shtml](http://www.Travelersphilanthropy.org/resources/conference-proceedings-2011.shtml)). They obtained a grant from the Inter-American Foundation for a three-year pilot project to set up the structures and operating procedures for a new organization and were helped by MVI, CREST, the Monteverde Chamber of Tourism, and a local bank. Initially, six hotels and several other businesses collected donations. Enough money was raised to fund major safety and access improvements to Santa Elena's multi-use community

center that functions as a gym for the high school and a site for educational, civic, and cultural events. In early 2013, the initiative became part of the new independent non-profit Monteverde Community Fund (J. Welch, pers. comm.; [www.monteverdefund.org](http://www.monteverdefund.org)). MVI continues to collaborate with them.

### **Conclusion**

The Monteverde Institute has exceeded the expectations laid out by its founders more than thirty years ago, and it has continued to evolve. In keeping with local and global changes, it broadened its mission in 1993 to "education for a sustainable future." From 1987 through 2018, MVI provided more than 600 courses to more than 11,000 students. The wide range of courses reflects partnerships with many different institutions that produce a solid financial foundation for MVI. A centrally located impressive campus offers many state-of-the-art facilities essential to MVI's mission while putting sustainability and conservation into practice. As it has provided unique place-based learning environments for international students, it has encouraged more community engagement among students, researchers, interns, volunteers, and staff to develop and share applied research projects that generate information as well as options and projects that help local communities and organizations deal with pressing issues that they have identified. These projects have ranged from architectural and landscape designs and community development planning to water quality issues, from health and nutrition concerns to applications of conservation biology theories and practices to reforestation and protection of biodiversity, to measures addressing global climate change. MVI students have also helped to construct sidewalks and trails, parks, rain gardens and water treatment systems, table gardens, and other community improvements requested by local organizations. The Institute plays a vital role in the functioning of many local organizations and has brought substantial educational, cultural, and economic benefits to local communities. As it develops its Strategic Guide for 2020-2030, MVI is building on the solid achievements of its past.

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