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WEF HIGHLIGHTS

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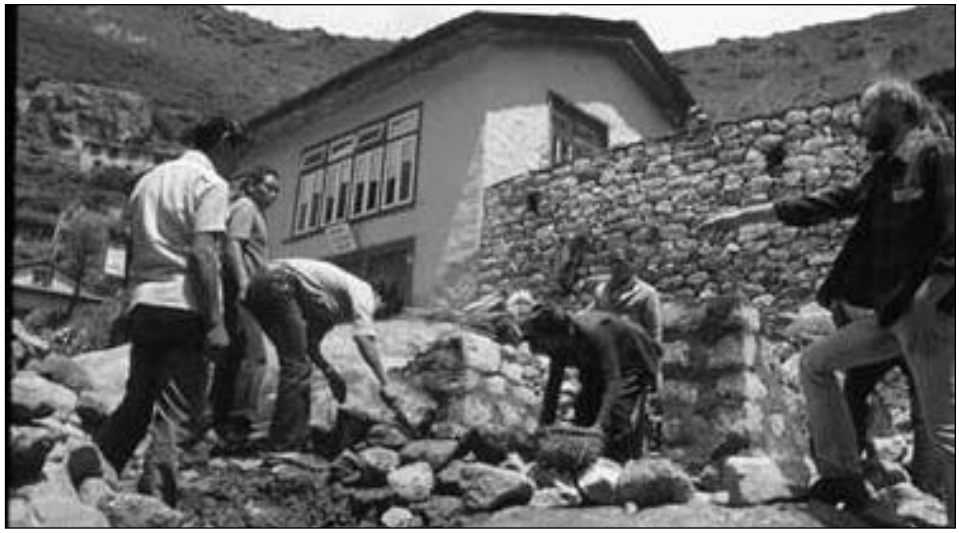
News for Members of the Water Environment Federation

In Their Own Words: WEF Members in the Peace Corps

Following is Part II of a two-part Highlights series featuring the experiences of WEF members who have served as volunteers in the Peace Corps throughout the world. As told in their own words, their service had an impact on not only the communities and people of the developing world, but their own lives professionally and personally. Read additional stories online at www.wef.org.



Bill Gifford (far right) at the construction of a water tap in Namche Bazaar in Nepal during his Peace Corps service, 1981 to 1983.

Bill Gifford — Nepal

In the Himalayan mountains of Nepal, nestled in a steep bowl on the side of a mountain, lies the Sherpa village of Namche Bazaar. One trail zigzags up to the village from the valley below. If you hike out on this trail for a week or so as I did, you will eventually come to a road that takes you to Kathmandu. There are also several trails leading up and out of Namche Bazaar, carved into the steep slopes. These lead to other Sherpa villages. One of them will take you to the base of Mount Everest, if you are in good shape and hike hard for 2 days.

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In His Own Words: Bob Forbes — Kingdom of Tonga

The seed to join the Peace Corps was first planted in me by President John F. Kennedy when I was only 7 years old. When he came on TV and challenged America's youth to help change the world, I believed him. That seed lay dormant until my senior year in college, when I again felt the itch to travel and experience another culture. I interviewed with the Peace Corps on campus that spring.

The summer after I graduated from North Carolina State University (Raleigh) with a bachelor's degree in civil engineering, I taught backpacking and rock climbing at a boys camp in the mountains while pouring over Peace Corps opportunities that came in the mail. I spent my off-days in the local library reading about countries I had never heard of. Before the summer was over, I had agreed to fill the position of water supply engineer in the Kingdom of Tonga in August of that year, 1976. I was on a plane bound for Tonga less

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Water Environment Federation®
Preserving & Enhancing the Global Water Environment

From the

PRESIDENT

A Busy Year Ahead

As the Water Environment Federation (WEF; Alexandria, Va.) begins another year, the board of trustees has established goals and objectives for the year. This work plan is not specifically defining the work to be done by the board, rather that to be done through the efforts of the WEF membership and staff. The work plan for 2005–2006 is divided into three general areas: WEF services; WEF structure; and the WEF mission.

Work Plan for WEF Services

The first initiative for WEF services is to improve publications. It is important to evaluate their value to membership and seek to continuously improve publications as appropriate. Among our goals is to make *Water Environment & Technology* a world-class magazine that appeals to our members and to a broader audience.

Many of WEF's members, particularly those in the academic community, are requesting additional opportunities for members to be published through WEF. The addition of a new online, peer-reviewed journal is currently being developed to provide one avenue for accelerated publication of specialty conference papers. In addition, WEF Press, WEF's book-publishing venture with McGraw-Hill, provides new opportunities for individual authors to develop manuals and textbooks.

WEF will focus on completing the implementation of the infrastructure public education program, "Water is Life, and Infrastructure Makes It Happen." The rollout of the program at WEFTEC®.05 was so successful that we ended up far exceeding our goal for signing up utilities to serve as pilot sites for the program.

We continue pursuing a program to develop strategies and a campaign to establish watershed-based permitting as the norm for water quality permitting.

We are all becoming acutely aware of the issues relating to a declining workforce and succession planning. WEF will seek to develop an industry program for attracting future workers to the water quality industry.

The most important consideration when seeking to improve WEF services is to understand the market conditions that drive these services. WEF is initiating a marketing survey that, among other things, will evaluate current WEF services and associated revenue, and identify additional services that will bring new products to the marketplace.

Work Plan for WEF Structure

In 2002, the WEF board of directors approved an update to the WEF strategic plan. The approved plan provided detail only to the strategy level. This year the Long Range Planning Committee is focusing on providing the necessary details to the WEF strategic plan with action items, schedule, responsibilities, and performance measures to be presented for approval by the House of Delegates (HOD) at WEFTEC.06 in Dallas.

The board of trustees is continuing to review and fine-tune WEF governance through a WEF leadership evaluation, and may propose constitution and bylaws changes for consideration by HOD in October.

We are very aware of WEF's slow but steady decline in membership. We are evaluating our membership structure and considering alternative structures and categories of membership with a focus on identifying whether another membership structure would result in more effective services to current and potential members.

Work Plan for WEF Mission

WEF is very concerned about the global water challenge. With billions of people on this planet lacking access to safe water supplies and sanitation, it is important for WEF to determine an appropriate role for itself in addressing

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WEF HIGHLIGHTS

News for Members of the Water Environment Federation

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EPA and WEF Work Together

Organizations Create Center of Excellence for Sustainable Management of Agricultural, Industrial, and Municipal Residuals

The Water Environment Federation (WEF, Alexandria, Va.) established a National Agricultural Manure Management Institute in November 2002 to encourage responsible and useful guidance for manure management. Since 2002, WEF has broadened its interests to include industrial and institutional byproducts as well as animal residuals in support of the EPA (Environmental Protection Agency) Center of Excellence for Sustainable Management of Agricultural, Industrial and Municipal Residuals.

The center was created through the efforts of a broad stakeholder group led by EPA and WEF to promote recycling of agricultural, industrial, and municipal residuals. The overarching goal of the center is to prevent multimedia pollution, save natural resources, and produce materials and energy from the byproducts of previously wasted materials.

With oil upwards of $60 per barrel and energy at a premium, does it make long-term economic or environmental sense to use raw materials just once, and then throw them away? Does it make long-term economic or environmental sense to fill up today's landfills at today's rates, when sites for new landfills may be very difficult to find in the future?

What are the Opportunities for By-Product Reuse?

Here is what is known to be the case for current recycling or beneficial use opportunities:

- The bulk of approximately 12 billion tons of nonhazardous agricultural, industrial, and municipal wastes are disposed of in landfills and surface impoundments rather than treated as byproducts with potential for reuse. Nonhazardous is defined in regulations developed under the Resource Conservation and Recovery Act. (See www.eh.doe.gov/oepa/ programs/rcradef.html.) While byproduct reuse is an environmentally sound concept, it requires economic and sociological consideration because of image issues.
- The direct application or indiscriminate disposal of untreated or unregulated byproducts can pose an environmental threat via one of several

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Cover Story

In His Own Words: Levi Dillon — Honduras

I served as a Peace Corps volunteer from 2003 to 2005 in Honduras, working in collaboration with the nongovernmental organization Plan International. There is a great need for technical assistance to volunteers working in water and sanitation in developing countries.

I studied environmental engineering at Northern Arizona University (Flagstaff) and was given sound training in designing and building water supply systems from the Peace Corps. However, the ability of one lone engineer to build anything of advanced sophistication is limited by time and financial resources as well as local technical know-how. All of these, except time, are of short supply in developing countries.

A water tank under construction in Flores, Honduras, under the supervision of Levi Dillon, Peace Corps volunteer from 2003 to 2005.

I worked mainly on two water supply projects during my service in Honduras, one of which was for the small mountain community of San Martin. The town has no electricity, a one-room schoolhouse, and is based around its coffee plantations. Most men make $4 to $5 (U.S.) per day by farming, manual labor, sustaining the coffee plantation, or growing corn.

Their existing water source was unreliable due to growth in the area and a shared conduction line. After conducting a community survey, I decided it would be best that San Martin have its own independent water system. I used a GPS (global positioning system) unit to survey San Martin. A reliable water source was already being used. From there I used an abney level and tape to conduct the topographic survey, and entered the data into a design spreadsheet in order to select the appropriate diameter tubes and complete the hydraulic design. I then provided a complete list of materials to construct the gravity-fed water system and 10,000-gal. distribution tank. When I left Honduras, we had just begun construction of the spring box and conduction line that would bring water to the distribution tank. Another Peace Corps volunteer took over when I left, and the project has since been completed and is functioning well.

Local politics are a constant challenge. Corruption and dishonesty run rampant in some places. In my experience, the easiest communities to work with tend to be smaller, well-organized communities. However, the needs of larger communities — because they are difficult to work in, require large capital projects, and perhaps more advanced engineering techniques — can be and are neglected.

Technical training of local host country engineers and further development of standard design methods that are unique to the geographical and socioeconomic area are urgently needed.

Levi Dillon is an engineer in training at Carollo Engineers (Fountain Valley, Calif.) in Phoenix, Ariz.

In His Own Words: Steven A. Schaefer — Guatemala

I was a Peace Corps Volunteer in Guatemala 1976 to 1978, arriving there after completing graduate school and on the heels of a massive earthquake during which it was estimated that more than 40,000 people died. I had completed my master's degree in civil engineering with an emphasis on water supply and wastewater engineering — a field in which I have worked throughout my career.

I arrived in Guatemala amidst the earthquake recovery effort, and enjoyed the challenges of being a part of the effort to reconstruct rural water supply systems in about 10 different communities in the Guatemalan highlands. We applied simple surveying, design, and construction techniques, for the most part finding springs in the mountains, and connecting them via gravity flow through small PVC pipes to small distribution tanks. The water was distributed to several community taps where the citizens would fill their containers. This was a big improvement for the people in these particular cases, who for the most part had to walk for miles to the nearest polluted stream to get any water at all, especially after the earthquake destroyed existing systems and wells. Of course, we only scratched the surface of the needs for clean water, and

most of the world is still struggling with the same issue today.

Guatemala's geography of extremely rugged mountainous terrain makes some areas difficult to access other than on foot. We had to use a lot of local labor to accomplish the work.

There were other challenges as well. It was quite noticeable during my time in the country that people from different cultures often clashed quite severely. At times it appeared that violence would break out, but perhaps the presence of members of the international aid community served to discourage it.

In Guatemala, there are many groups of indigenous peoples who have historically been forced to stay in poverty or simple sustenance living by descendants of the European settlers who colonized the country. This economic model could potentially have worked fairly well if the indigenous people had been allowed to keep the land that was historically theirs for cultivation. However, this is far from the case. Foreign settlers forced native peoples off the best land. During the earthquake recovery effort, these groups temporarily set aside their animosity due to the close attention paid by the international aid community. The animosity came right back shortly after I left, with massive civil unrest and war leaving many peasants slaughtered or forced into hiding, or to flee to Mexico and the United States.

Though there were glitches, overall the experience was very rewarding and I would recommend it to almost anyone with any desire to help those in need. I left Guatemala a very different person, with a better understanding of the challenges in this part of the world. I gained much more than I was able to give. I felt then, and still feel now, that we can do a lot more to improve the opportunities for people in countries such as Guatemala. There are many countries with similar issues, though the specifics vary from place to place. The approach to these issues has to be on many fronts at all levels of the society, including spiritual, economic, political, educational, and engineering and appropriate technology aspects. Any part of the approach left unaddressed leads to failure, despite all best efforts on other aspects.

Steven A. Schaefer is a principal engineer at Parsons (Pasadena, Calif.) in Tampa, Fla.

Bob Forbes — Kingdom of Tonga *continued from page 1*

than a month later.

I was among about 20 technical specialists who arrived as part of the Peace Corps' "Tonga Special Services Omnibus" that year. We became immersed in language and cultural training inside the country, and then I began my job as chief engineer for the Tonga Water Board a couple of months later.

There I monitored the operation of an 1893-m^3/d (500,000-gal/d) water supply system to the capital city of Nuku'alofa, and conducted investigations into the groundwater supply of the main island, Tongatapu.

I found the work both fascinating and frustrating. I performed a wide variety of tasks from testing the quality of the drinking water, to laying out village water systems, conducting groundwater surveys, and writing proposals for grants and foreign aid. When the manager of the Water Board made his plans for a 2-month home leave back to the Philippines during my second year, he asked the board to appoint me as its acting manager. It was a position of responsibility unprecedented by a Peace Corps volunteer in Tonga at the time, and a downright scary assignment for a 24-year-old American only a year out of college. We even experienced a threat of a small cholera epidemic from a neighboring island group during that stint, and had to double the chlorine dose to the capital city's water system as a result.

Bob Forbes, right, with his Tongan assistant, Taniela Latu, during Forbes' Peace Corps service, from 1976 to 1978.

For a brief period after my Peace Corps assignment ended, I served in 1979 as a paid consultant to the Tonga Water Board while completing several water system designs and grant proposals.

My Peace Corps experience taught me a lot of things, but perhaps the main two lessons I learned were that one, clean water is a precious commodity, even in a place that is surrounded by water and receives 70 in. of rainfall a year; and two, I did not know nearly as much as I wanted to about what it takes to treat and manage water for the good of our public health and the environment.

I applied to several graduate schools and took the GRE while overseas. I was accepted by the School of Public Health at the University of North Carolina, Chapel Hill, where I earned my master's degree in environmental engineering. I've spent my career engineering water and wastewater treatment processes ever since.

Bob Forbes is a senior technologist at CH2M Hill (Englewood, Colo.) in Charlotte, N.C.

Gifford — Nepal *continued from page 1*

At the bottom of Namche Bazaar, a cold, clear mountain spring bursts forth from the side of the hill and tumbles 1000 ft. or more to the river below. The Sherpas discovered this stream hundreds of years ago, and built their little village around it. As the village grew, the houses and potato fields slowly crept up the hill. When I arrived as a Peace Corps Volunteer in 1981, there were more than 700 people living in Namche, and many would descend 600 vertical ft. or more to fill a 20 L jerry can with water, hoist it on their back, and trudge back up the hill. This would be similar to taking the stairs up a 60-story building with 45 lbs of water on your back, twice a day. Even though water at the spring was clean and plentiful, water throughout much of the village was precious.

For two summers, the Sherpas and I built a village water system. UNICEF supplied the pipe, the cement, and the pumps. The villagers supplied sand, gravel, stone, and labor. Peace Corps supplied me. Twice, we flew cement and other materials from Kathmandu to the nearest airport. From there, porters carrying one bag of cement each hiked for 2 days to reach the village. Once, when there were no available planes, we hired porters to haul bags of cement for 10 days from the road head.

The pumps were hydro rams. Using a water hammer principle, these pumps were capable of pumping water 600 vertical ft. up the hill. We installed two hydro rams near the stream, where they were powered by the stream itself, with no need for electricity. We pumped the water to two stone and concrete water tanks that we built on the hill behind the village. Twenty-four hours a day, water was pumped into the tanks. From the tanks, we ran pipes down the hill to seven water taps located conveniently all over the village. When the project was finished, all villagers were just a short distance to fresh water, saving countless hours of hauling water.

While in Kathmandu, I spent much of my time working with Mother Teresa's sisters. They were helping crippled and blind people who were living at the Hindu temple complex of Pashupatinath. The sisters fed and bathed the people, and provided some medical care. Water was stored in large, leaking tanks, which would run dry every day before the city water came back on. I was able to repair the tanks so water was always available. There were two toilets, but no sewer or septic system, so the site was contaminated with human waste. With materials donated by UNICEF, and with money contributed by family and friends from home, I built two septic tanks. Each contained double chambers so that one chamber could lie dormant, allowing the pathogens to die, while the other chamber was filling.

These small efforts were part of a much larger program throughout the country of Nepal, involving hundreds of people, bringing clean, convenient water to the villages, and teaching the people how to build simple, sanitary toilets to reduce the spread of disease.

When I arrived, I did not especially value my engineering skills and thought I might do something else when I returned home, but I learned how valued technical ability is in underdeveloped countries. In America, we seem to take it for granted that there are plenty of people who know how to design and build things. In Nepal, these skills were in short supply. I came home, proud to be an engineer, and pleased to know that my skills truly do make a difference in the world.

Bill Gifford is an engineer at CH2M Hill (Englewood, Colo.) in Corvallis, Ore.

EPA and WEF Work Together *continued from page 3*

different pathways, such as exposure, inhalation, or direct contact.

- To maintain navigability of waterways, the U.S. Army Corps of Engineers dredges large volumes of sediments that continue to accumulate and occupy landfill space without suitable outlets for reuse.
- Advancements in municipal and industrial waste treatment technologies combined with the increase in the U.S. population, population served by municipal sewers, and large-scale concentrations of animal feeding operations collectively have contributed to a substantial increase in the volume of generated residuals.
- Compliance with environmental regulations frequently results in the conversion of regulated pollutants from a gaseous and soluble form to a solid or semisolid insoluble form, thus increasing the volume of solids requiring management.
- Recovery and reuse of residuals offers tremendous environmental and energy-related opportunities.

But There Are Challenges

The innovative uses of nonhazardous agricultural, municipal, and industrial byproducts are affected by regulations, technology, economics, markets, and public acceptance. The Center of Excellence stakeholders have defined these challenges.

- **Regulatory:** Residuals and by-products are regulated by federal law and/or by state requirements which vary considerably and can limit beneficial use options. There are a variety of federal and state regulations that govern beneficial use of various materials. At the federal level, 40 CFR part 257 (1979) regulates industrial waste from the food processing, paper mill processing, and other nonhazardous industrial sources. Municipal biosolids are regulated through 40 CFR part 503 (1993). Animal waste is largely

unregulated but in a limited fashion is guided by the NRCS 590 standard. Since the general authority of these programs is issued under different federal legislation (RCRA, CWA, Farm Bill, etc.), there is a lack of facilitation for comingling or innovative approaches for beneficially using these materials. State regulatory agencies often regulate such materials through either their water or their solid waste programs, and oftentimes they are separated by the governing statutes. Therefore a solid waste may be regulated through one set of regulations in one division, and biosolids regulated through a different regulatory framework in a different division. Such obstacles will need to be addressed in order to make meaningful progress on promoting beneficial recycling.

- **Technical:** The 1992 503 Rule provides the backbone for municipal wastewater solids (biosolids) beneficial use. Risk analysis, evaluations, specification development, and demonstrations are needed by generators, end-users, and regulators to help make informed decisions for the beneficial use of industrial residuals.
- **Economic:** The selection of a residuals management option is affected by the cost of technology, funding support, project sustainability, the available market for the byproducts, transportation costs, and the regulatory process. Low disposal costs will negatively affect the economics of pursuing beneficial use.
- **Public Acceptance:** Public acceptance of recycling and beneficial use is based on broad stakeholder understanding of the appropriate options for residuals management.

And the Solutions: The Stakeholder Approach

WEF and EPA Region 5 Water Division and Waste, Pesticides, and Toxics Division have been working with stakeholders on the beneficial use of municipal and industrial byproducts since 1999. More than 150 speakers representing a broad range of technologies and disciplines have combined to participate in five municipal and three industrial "beneficial uses" events (symposia, conferences, summits) have been held. All of the papers presented as part of the combined WEF- and EPA-sponsored events can be downloaded free-of-charge at www.wef.org/MembershipServices/MembershipInformation/CommitteeList/AgriculturalandIndustrialResiduals.htm.

Achieving Sustainability

When an activity can be carried out without damaging the long-term health and integrity of natural and cultural environments, it may be termed "sustainable." Maintaining a Center of Excellence to address the byproducts challenges will rely on the sustainability of byproducts management.

A Center of Excellence can promote a sustainable future by:

- Promoting technology- and risk-based focus on alternative markets in the development of recyclable residuals;
- Encouraging combining agricultural, industrial and municipal residuals management options and programs whenever possible — they are not mutually exclusive!
- And by using the Web site to serve as a conduit for technology transfer, information exchange, and as a

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Women of Water Provides Networking Opportunity

Women in the water and wastewater industries are getting together and making a big splash with the creation of the nonprofit organization, Women of Water (WOW).

The brainchild of two industry women having lunch during WEFTEC.04®, WOW was created for women involved in all aspects of the water business — whether in manufacturing, consulting, engineering, academia, government, or nonprofit organizations — to come together to learn, grow, reach out, network, and mentor. Since its inception, WOW has developed support from numerous companies such as Headworks® Inc. (Houston, Texas) and Earth Tech (Long Beach, Calif.), and has received positive and encouraging feedback from women and men throughout the nation.

WOW aspires to develop and continue to grow through outreach to all the women in the industry. The organization's founders recognize that networking and mentoring is a crucial factor in business success and in attracting and retaining young people to the industry. Having guides in this industry dramatically facilitates success in technical and theoretical knowledge as well as navigating the male-dominated waters.

Since the organization is still in its formative years, the president and founder of Women of Water, Headworks Inc. Chief Executive Officer Michele LaNoue, encourages women to help make the group a truly viable organization by stepping up and taking the reins of leadership.

WOW will be hosting its next luncheon at the AWWA (American Water Works Association) Texas Water Show in Austin on April 6, noon to 1:15 p.m., in Ballroom F of the Austin Convention Center. If you would like to attend, please contact Azeemeh Zaheer at azaheer@headworksusa.com.

For further information, to become a member, or to run for office for Women of Water, please visit the Web site at www.womenofwater.org.

— Diane Meyer,
Val-Matic Valve & Manufacturing Corporation (Elmhurst, Ill.)

EPA and WEF Work Together *continued from page 7*

repository of information on availability of technologies to pretreat, coprocess, blend, and produce materials and energy from mixtures of organic and inorganic residues.

The Future Measures of Success

The Center of Excellence will focus on specific projects, subject to funding and stakeholder support, with measurable results. Measures of success during the program will include:

- An initial assessment of available documentation of byproduct material; an estimate of the amounts of biosolids and industrial and agricultural byproducts and sediments generated and how they are managed; annual updates to provide a measure of the amounts of materials beneficially used;
- An assessment of public reaction to beneficial use as measured by individual stakeholder reviews;
- Reduction in selected pollutants reported in the Toxic Release Inventory;
- Increase in the availability of waste-derived products; and
- An increase in the number of public acceptance demonstration projects.

The Center of Excellence is a public-private partnership with other interested organizations dedicated solely to promoting and facilitating recycling and reuse of municipal, agricultural, and industrial byproducts. As with any consortium, progress will depend on the dedication and resources afforded by the participants. WEF and EPA are determined to make this broad stakeholder approach a working and viable answer to address the quality-of-life challenges associated with the production and reuse of residual by-products.

— Gene De Michele,
WEF Government Affairs

From the President *continued from page 2*

the global water challenge.

WEF and its members are leaders working for the preservation and enhancement of the global water environment. Unfortunately, as of yet, the recognized portion of the vision is lacking. In 2006, WEF will develop strategies to achieve the recognition that is critical to its success, and to become the go-to organization for water quality information.

J. Michael Read
2005-2006 WEF President