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SUCCESSFUL TECHNOLOGY TRANSFER FOR DEVELOPMENT

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MOVING FORWARD

USAID's US-Asia Environmental Partnership (US-AEP) program worked for over a decade to transfer and encourage the use of environmental technologies, know-how, and best practices in industries, businesses, policy making organizations, and community programs in Sri Lanka. As a result, US-AEP catalyzed many successful projects, benefiting both the people and environment of Sri Lanka. A large portion of this success was due to the flexible programming tools used by US-AEP to support activities.

US-AEP tools used to facilitate project design and implementation included exchanges, technology demonstrations, technical assistance, workshops, and short- to medium-term partnerships between US and Asian institutions. At the core of US-AEP/Sri Lanka's strategic approach in applying these tools was the promotion of partnerships between public and private organizations in Sri Lanka and counterparts in the U.S. and other Asian countries that facilitated exchange of technology and expertise.

This document provides an overview of the programming tools used by US-AEP, the strategic partnering approach followed in applying these tools, and "lessons learned" from a decade of program implementation in Sri Lanka.

BRINGING STAKEHOLDERS TOGETHER

For over ten years, US-AEP brought together local stakeholders and international environmental experts to rigorously identify environmental challenges and technical needs in Sri Lanka. US-AEP also supported partnerships between these groups to identify and implement appropriate solutions.

US-AEP IN SRI LANKA

US-AEP was a regional program of the U.S. Agency for International Development (USAID) that worked from 1992 to 2005 to address the environmental challenges associated with urbanization and industrialization in Asia. Over the years US-AEP supported initiatives in eleven countries (Hong Kong, South Korea, India, Indonesia, Malaysia, the Philippines, Sri Lanka, Singapore, Taiwan, Thailand, and Vietnam) partnering local governments, businesses, NGOs, and academic institutions with US counterparts. In 2005 alone, US-AEP worked with over 300 regional partners supporting the efforts of 67 program initiatives working to:

- Improve water quality and supply
- Clean the air
- Strengthen environmental governance
- Improve solid and hazardous waste management

US-AEP countries face the dual challenge of promoting economic growth while also trying to reduce the negative environmental impacts of that growth. US-AEP contributed to this process of "green development" by increasing access to and knowledge of technologies and processes through partnerships and collaborative approaches. As a regional program working in countries with similar environmental challenges, US-AEP also had the ability to leverage and multiply impacts for the benefit of each individual country as well as the Asia region as a whole.

In Sri Lanka, the US-AEP program started in 1995. From the outset, the program promoted partnerships and collaborations to identify and introduce better environmental practices in the country. Interventions included assistance to develop or change policy and legislation, improve awareness of environmental issues, and identify and promote best practices and technologies to address environmental problems. Technology transfer in particular was a key program element.

Adaptation of new technology is essential to solve existing and emerging challenges of development and environmental degradation. Partnerships are a valuable platform that can help discern the appropriateness and best use of different technologies, allow for the pooling of resources and expertise, and facilitate wide buy-in. The experience of utilizing US-AEP program tools and the implementation strategy in Sri Lanka has provided valuable insights into partnering for successful transfer of technology for environmental management.

US-AEP TOOLS

As in other Asian program countries, US-AEP in Sri Lanka used grants, exchanges, and technical assistance to support program initiatives.

GRANTS

Targeted grants proved to be a particularly useful tool in promoting the transfer of technology and expertise to Sri Lanka. Grant mechanisms included: (1) the State Environmental Initiative -- matching grants of up to $150,000 awarded to U.S. state agencies that linked American expertise with Asian demand for environmental improvements; (2) Environment and Civil Society Partnership grants of up to $25,000 to Asian non-governmental organizations to encourage collaborative public-private environmental improvement efforts; and (3) Technical Support and Quick Response Grants of up to $25,000 provided to local and U.S. organizations supporting a wide range of environmental activities.

Individual grants were not simply awarded in support of a series of one-off activities. Instead US-AEP/Sri Lanka strategically issued grants to support specific activities that contributed to a broader agenda or initiative and the exploration of innovative ideas. Grants encouraged research to address knowledge gaps and the pooling of resources towards meeting project costs. Grants helped to build links with a wide range of partners and institutions while also providing support to good ideas and projects undertaken by other donors, private, and/or public sector entities.

EXCHANGES

A distinctive feature of US-AEP throughout its history was its support for efforts to bring together Asian and U.S. participants to exchange experiences and knowledge on environmental issues. These exchanges allowed Sri Lanka in professionals to gain first-hand exposure to new technologies, policies, and management approaches and to see how these are being applied in other countries. These experiences greatly enhanced subsequent adaptation of such mechanisms in Sri Lanka.

Exchanges allowed Sri Lankan participants to explore a wide range of environmental subjects and also helped to fast track solutions to specific problems, address technology gaps, and explore new solutions. Exchanges increased the awareness of environmental problems and solutions within the country while also giving participants a chance to improve their knowledge and interact and learn from the experience of others. These interactions cultivated important links between Sri Lankan and foreign experts in the same business.

In just the last four years, through US-AEP, over 100 Sri Lankans participated in more than 50 forums exploring a wide range of topics, including: air, water and noise pollution management, solid waste and hazardous waste management, legal procedures and policy development, vehicle emissions testing, hydroponics, aquaculture, municipal services delivery, GIS, environmental journalism, and environmental education.

TECHNICAL ASSISTANCE

An important US-AEP program strength was the ability to deliver timely and appropriate technical expertise. Short-term technical assistance (STTA) contracts allowed US-AEP to bring in U.S. or regional experts to work with Sri Lankan peers to transfer information and knowledge in particular technical areas.

Often, when a technical need was identified by a Sri Lankan organization, US-AEP was able not only to fund the technical assistance, but also use formal partnerships with U.S. government agencies and industries and other Asian institutions to identify appropriate technical experts to work alongside Sri Lankans. Particularly helpful in this regard was the program's relationships with the U.S. Environmental Protection Agency (EPA) and U.S. state organizations from Minnesota, Wisconsin, and Arizona. Given Sri Lanka's small size, linkages with U.S. states were particularly useful because states deal with problems of a similar scale.

In addition, US-AEP/Sri Lanka benefited greatly from USAID's Environmental Technology Network for Asia (ETNA). ETNA performed technical research to brief US-AEP staff on technology options and identified companies that could provide different technologies. ETNA also sent out "technology needs" announcements to U.S. vendors to facilitate direct contact between Sri Lankan government agencies and companies and U.S. companies that could provide them with appropriate technical solutions.

Given US-AEP's regional focus, expertise also was available from individuals within the region facing similar circumstances -- good allies in technology transfer.

SOLID WASTE SOLUTIONS THROUGH PARTNERSHIPS

A state-of-the-art garbage system is turning some of Colombo's mountains of waste into marketable compost, easing the capital's disposal problems and offering hope for other cities. The system is a result of a public-private partnership between Burns Environmental Technologies Ltd., a U.S. company, and Colombo's Municipal Council, which US-AEP supported through grants, exchanges, and technical assistance over four years.

US-AEP assistance added value to a micro-finance based community recycling initiative by improving the plastic processing technology that in turn increased the marketable price of plastic in the city of Galle. More than 45 small women's groups derive an income, make compost, and receive small loans from this waste trading scheme that is being implemented by the Arthacharya Foundation (NGO). The City of Galle has also benefited from a reduction of the municipal waste stream by 20%.

A solid waste management solution was implemented in the Karapitiya Regional Teaching Hospital in the Southern Province. The introduced system first separates the waste into organic, plastic, paper, hazardous waste, etc., and then, uses the organic food waste to generate biogas for cooking. The plastics and paper are sold to recyclers and the slurry (a by-product from the biogas production) is used as fertilizer in a home garden in the hospital premises. This has reduced fuel costs, generated some income and solved the solid waste problem in the hospital. This pilot waste to energy model was developed through a US-AEP small grant administered by the Asia Foundation and implemented by the NGO, HELP-O.

Through a Council of State Governments grant, the Minnesota Technical Assistance Program (MnTAP) worked with two Sri Lankan institutions, the Industrial Technology Institute and the Small and Medium Enterprise Development Project to set up an internet based waste exchange mechanism to link industries to exchange re-usable waste materials and reduce the amount of materials ending up in garbage dumps.

STRATEGIC PARTNERING APPROACH

Environmental management was introduced to Sri Lanka in the 1990s but the implementation of best practices and enforcement of environmental regulations was slow due to the priority given to poverty reduction and rapid economic growth. In addition, the institutional expertise and knowledge needed for better environmental management was not readily available. USAID saw the potential value of partnering local Sri Lankan groups with organizations outside the country to solicit needed expertise, supplement local resources, and promote local "champions" committed to implementation of environmental safeguards.

To this end, US-AEP used available program tools in concert to address priority environmental technology and policy needs in Sri Lanka. The core US-AEP/Sri Lanka strategy was to promote U.S.-Sri Lankan partnerships that facilitated application of new technological solutions via a careful, staged approach. Different combinations of tools were used to flexibly support efforts at each stage of partnership development:

IDENTIFY NEEDS

- ***Identify a technical need.*** Being a demand-driven program, US-AEP typically relied on Sri Lankan organizations to articulate needs. However, US-AEP also used exchanges to expose Sri Lankan participants to unfamiliar environmental technologies and policies in the US and other Asian countries. This exposure often piqued interest in particular environmental problems and led to requests for US-AEP assistance to begin addressing associated needs.

- ***Develop an in-depth understanding of the need.*** Before initiating support to address a particular need, US-AEP critically identified the relevant political climate, influential decision makers, business practicalities, in-country capacity available, and potential solutions.

IDENTIFY PARTNERS & SOLUTIONS

- ***Identify appropriate technologies and potential organizations to provide solutions.*** Matching technologies, partners, and applications is the basis of a strong partnership. If an unknown organization volunteered participation or a new technology was identified, US-AEP used its U.S. and Asian partner contacts to investigate and evaluate them.

- ***Identify appropriate local partners.*** US-AEP performed due diligence evaluations of local partners to determine which organization would be best suited for implementing the technology transfer. US-AEP developed buy-in among these local partners by selling the benefits of participation and providing the resources needed for partnership building.

- ***Assist with creating the connection.*** US-AEP used exchanges, grants, and technical assistance to help Sri Lankan organizations to develop contacts with potential US and Asian partners as well as amongst stakeholders within the country.

- ***Convene stakeholders.*** US-AEP funded various forums to bring together stakeholders to review and prioritize objectives, design programs and to determine the necessary next steps. These forums were a monitoring mechanism as well as a means to identify knowledge gaps and other needs. Networking and establishing a common agenda was a vital part of the initial process to determine how the project would proceed. These open forums also promoted accountability and transparency in the process.

- ***Conceptualize the partnership format.*** US-AEP worked with the partners to cooperatively develop a project strategy including a definition of the roles and responsibilities of each partner.

PROMOTE PARTNER RELATIONSHIPS

- ***Initially manage the partner relationship.*** In the partnership's infancy, US-AEP provided guidance on implementation, suggestions for project timelines, and resources to support partnership interaction and joint activities.

- ***Capacity building and knowledge transfer.*** US-AEP mixed and matched available program tools to increase the technical capacity of Sri Lankan partners and enhance the sustainability of project outcomes. In many cases, several partners supported by US-AEP worked at different levels on the same topic and contributed to the whole.

- ***Continual follow-up to ensure success.*** A key to successful partnership building is continual and open communication with partners. As much business in Sri Lanka is done in-person, this required facilitation and financial support for face-to-face interactions. Follow-up by US-AEP staff was also required to maintain momentum toward attaining desired results.

IDENTIFYING TECHNICAL NEEDS

A groundbreaking US-AEP sponsored study of vehicle emissions using remote sensing technology has laid the scientific base for identifying high polluting vehicles and targeting vehicle types in emission control. A good baseline of fleet characterization and air pollutants now exists to measure the effectiveness of the new national vehicle emission testing program.

TREATMENT TECHNOLOGY PARTNERING

Lacking locally available treatment technologies, Sri Lanka has been unable to enforce service station wastewater regulations. A US-AEP-sponsored study identified and successfully piloted an appropriate technology marketed by Carbonair, a U.S. company, which recycles used oil and treats remaining wastewater.

TECHNICAL SOLUTIONS FOR MANAGEMENT

The capacity to effectively use Geographic Information System (GIS) map data in Sri Lanka is limited. US-AEP partnered with the Asian Institute of Technology to train the Sri Lanka's Urban Development Authority in GIS data processing and sharing. These trainees are already applying their new skills to post-tsunami environmental rehabilitation and planning new cities.

WHAT WAS LEARNED

US-AEP's decade of work in Sri Lanka has highlighted some keys to successfully catalyzing technology partnerships that address environmental problems. At the same time, these lessons learned may well be instructive to organizations promoting international partnering in other sectors.

Recruit the Right Local Partners and Champions

Identification of the right local partners was essential to each project's success. To be sustainable, projects needed to be supported by knowledgeable, qualified and committed partners that could champion the projects over time. The ideal US-AEP partner in Sri Lanka typically had a mix of the following qualities:

- High technical and management capabilities
- Strong communication skills that could reach from the grass-roots to the government advocacy level
- Familiarity with the Sri Lankan investment/regulatory atmosphere
- Internal resources sufficient to wait out project timeline/project ramp-up or lag time
- Operational transparency
- Ability to think "out of the box" in an adaptive and innovative manner
- International track record
- Ability to communicate in English

Allow for Building Local Partner Capacity

It was often challenging to find local partners that fully fit the desired partner criteria. As an alternative, US-AEP sometimes engaged existing partners with new tasks outside their current skill set while simultaneously supporting organizational capacity building via:

- Training opportunities in Sri Lanka and abroad
- Increased exposure to new technologies
- Instruction on international business protocols, e.g., writing emails, contract negotiation
- Promoting professional association linkages, both in Sri Lanka and internationally

US-AEP/Sri Lanka viewed capacity building among Sri Lankan organizations, government, and businesses as a fundamental programmatic goal. These activities helped various Sri Lankan organizations become more active internationally and develop professionally. Particularly important professional skills that US-AEP helped to develop were the capacity to analyze technological needs and use critical thinking to propose solutions and use sound scientific criteria to assess them.

Support Benchmarking

Collection of extensive, high quality data is necessary to track the impact of environmental pollution abatement efforts. Given the dearth of such data in Sri Lanka, US-AEP saw the value of supporting "benchmarking" of environmental conditions and gathering monitoring data on a regular basis to guide design and implementation of projects.

US-AEP supported the establishment of the first benchmarks for a variety of environmental indices (e.g., levels of ambient lead, noise pollution, and vehicle emissions) by providing grants to organizations for sampling and monitoring work. These data allowed Sri Lankan scientists to quantitatively describe current environmental impacts, and were then used to guide scientists and policy makers in identifying appropriate policy and pollution control strategies.

These efforts not only helped target US-AEP support more effectively, but left behind vital information for the Sri Lankan government in support of its ongoing pollution control efforts.

Energy efficiency through best practices and benchmarking

US-AEP Sri Lanka has worked with the Alliance to Save Energy (ASE) to initiate energy efficiency practices in the water supply sector and the tourism sector in Sri Lanka.

ASE worked with the staff of the National Water Supply and Drainage Board to improve energy efficiency through better management (scheduling operations) and technical interventions (power factor corrections, etc). These interventions have led to reductions in monthly total electricity (kVA demand) by about 20%. Energy Audits were also carried out in two water treatment plants and these audits were able to show how savings are possible through energy efficiency and this has generated much interest in the NWS&DB on energy efficiency practices.

In the tourism sector, The USAID sponsored "Tourism Cluster" worked with US-AEP and ASE to implement a database system to benchmark the energy saving potential at different operational levels in a hotel, such as, lighting, air conditioning, water pumping, kitchen operations, wastewater treatment, etc. The interventions include identifying areas of potential savings and introducing technical and financial systems to facilitate implementation. Some of the hotels involved in this benchmarking exercise that were affected by the Tsunami are now incorporating some of the recommended changes in the rebuilding process.

PARTNERING ON TSUNAMI RELIEF

In January 2005, US-AEP assisted the US based ITT industries to form a partnership with ISB to facilitate the donation of water purification equipment to communities affected by the Indian Ocean Tsunami. This collaboration enabled the rapid installation of equipment that provided drinking water for more than 25,000 people. US-AEP provided guidance, raised funds and facilitated local linkages that allowed for the successful deployment of this emergency response.

A KEY LOCAL PARTNER: Industrial Services Bureau (ISB)

Because ISB exhibited many desirable local partner qualities and willingly worked to develop them further, US-AEP/Sri Lanka developed a close working relationship with this engineering consulting company. Central to the value of the ISB relationship was the organization's ability to "screen" environmental technologies to judge their appropriateness for Sri Lanka. Some of the resulting successful partnerships are as follows:

- US-AEP supported several exchanges that facilitated ISB staff participation in the Arizona–Sri Lanka State Environmental Initiative. Through this initiative ISB was linked with South West Wind Power, based in Flagstaff, AZ, and pilot tested the feasibility of establishing small off-grid wind turbine projects to provide power to a rural population where grid energy was not feasible. This pilot not only provided electricity to 35 homes on a remote island (Bathalandunduwa) but has also generated interest among several donors and tourism developers in using the small wind turbines in development and commercial projects.

- ISB also capitalized on contacts made with Environmental System Products (ESP) of Arizona to carry out a US-AEP sponsored study on vehicle emission characteristics to identify the type of vehicles that need to be targeted for emissions control. ISB and ESP together were then able to secure a government contract to implement a mobile vehicle emission testing program in Sri Lanka.

- Through another state initiative with Minnesota and Wisconsin, ISB identified several products to improve wastewater management, specifically oil-water separators and aerators. They also established trade links with several US-based companies that market these products.

- Exchanges also allowed ISB to develop important relationships with Sri Lankan officials and US companies that contributed to increasing the skills and capacity within the organization.

- US-AEP-supported exchanges led ISB to realize the need for awareness programs and scientific interpretation of observations. As a result, ISB created the non-profit organization Wayamba Integration for Growth and Sustainability (WINGS) that promotes rural development and assists in rural industrialization, while safeguarding the environment. Through their main program component, the Community Led Environmental Action Network (CLEAN), WINGS promotes environmental awareness through active participation of school children and the general public.

The decade long US-AEP and ISB relationship has helped ISB to develop its capacity and expand its work into new environmental management areas. This development of environmental technology leadership in Sri Lanka is the most valuable of US-AEP legacies.

WHAT WAS LEARNED

Use Partnerships to Leverage Additional Resources

In working to leverage the program's available assistance tools, US-AEP/Sri Lanka maintained close contact with other international donors, key environmental policy makers, NGOs, and private sector stakeholders. This was done through informal and formal contacts, including US-AEP representation on environmental group advisory committees, e.g., the Sri Lanka National Cleaner Production Centre and Global Environment Fund (GEF) Small Grant Program. US-AEP also maintained good relationships with other donors such as the World Bank, Asia Development Bank (ADB), and AusAID.

These relationships provided meaningful access to all parts of the environmental "world" in Sri Lanka, and allowed US-AEP to strategically complement many activities initiated by others and foster the development of joint assistance programs. By maximizing resources, reducing duplication, and allowing for wider coverage, this cooperation also allowed greater flexibility to cover a range of objectives and projects that would not have been possible if US-AEP had worked independently.

Close interaction with these key players also assisted in leveraging other USAID resources. Notably, the US-AEP "partnership mentality" and established connections with the private sector helped to quickly mobilize the USAID/Sri Lanka mission to tap newly available USAID Global Development Alliance (GDA) funds.

Leveraging private sector contributions to project implementation also grew over the years and helped to stretch the USAID dollar.

Make the Most of Regional Liaisons

Asia's industrializing economies face a myriad of similar environmental challenges. By interacting with its regional neighbors, Sri Lanka has the opportunity to learn from other countries' environmental management experiences and leapfrog forward in its own efforts. Being a regional program, US-AEP was in a unique position to identify important commonalities and help Sri Lanka tap regional expertise.

US-AEP staff and partners met annually to share work plans previewing the year's upcoming activities. These meetings and other regional communication facilitated by the program (e.g., the US-AEP website) helped identify common concerns and led to the design of inter-regional support. US-AEP regional cooperation also facilitated the initiation of activities in collaboration with other regional donor programs. A prime example was cooperation with the ADB on the Clean Air Initiative for Asian Cities.

US-AEP regional interactions catalyzed many important advances in environmental management efforts in Sri Lanka and helped foster lasting regional partnerships—relationships that should continue benefiting regional environmental professionals for years to come.

Influence Sri Lanka's Next Generation

Reaching environmental compliance targets, greening industries, and establishing sustainable livelihoods requires civic consciousness and action. The public needs to better understand the linkages between human actions and environmental degradation. By involving people in activities that demonstrate these linkages, offer solutions and alternatives, and highlight health and economic benefits to their own lives, one can change habits and build support for better environmental stewardship. Improved public awareness also helps to engage politicians and decision makers.

To foster environmental stewardship, US-AEP worked to enhance awareness with programs supporting hands-on, science-based, interactive, and fun learning activities involving actual restoration or management of natural resources. As children can effectively influence their parents and society at large and will continue to be environmental stewards into the future, several US-AEP supported activities engaged school children in learning about environmental problems and applying interventions to mitigate pollution. The goal was not only to increase awareness but also to make children understand that they can take action and influence others.

Along with programs for school children, US-AEP invested in improving the knowledge and skills of university students in environmental management. Activities included topics like cleaner production and also provided students with opportunities to intern with relevant organizations.

Use Trade Partnerships to Benefit Environmental Management

Providing services through private sector investment is a proven sustainable mechanism. However, creating an enabling environment for the private sector to participate in service delivery is challenging and often needs support.

Several US-AEP/Sri Lanka efforts helped to develop local and international trade and investment opportunities leading to better environmental management. Certain technologies and processes tested and used in developed countries were identified to address environmental problems in Sri Lanka. US-AEP efforts in technology identification and transfer led to a win-win situation for both the technology provider and the user. Having a flexible set of tools, such as technology promotion grants and exchanges, helped to promote initial trade contacts and demonstrate applications before finalization of trade deals.

EDUCATING TOMORROW'S ENVIRONMENTAL CHAMPIONS

Global Learning and Observations to Benefit the Environment (GLOBE) is a hands-on education program that unites students, teachers, and scientists from around the world to research the Earth's environment. US-AEP helped launch GLOBE in Sri Lanka through support of the program's first national teacher training – an example of US-AEP's commitment to educating Asia's future environmental leaders.

MOVING FORWARD WITH THE PARTNERSHIP APPROACH

The ten years of programmatic experience accumulated by the US-AEP/Sri Lanka team argues well for the benefits of promoting international public-private development partnerships—a model being carried forward by the USAID Global Development Alliance. While successfully applying this model is seen to be part art, part science and managing the multiple relationships involved is difficult, an effective strategic approach has been demonstrated.

The US-AEP strategic approach has had considerable success in creating partnerships that have resulted in significant environmental improvements in Sri Lanka by carefully:

- discerning local short- and mid-term needs,
- selecting and developing suitable partners to address these needs, and
- using flexible program "tools" sequentially to promote partnerships.

US-AEP impacts also have a strong chance of being sustainable in the long term. A particularly important element of this potential for sustainability has been the creation of future leaders among Sri Lankan environmental professionals. Through partnership interactions, a variety of individuals and organizations have developed the ability to critically analyze problems and potential solutions and cooperate effectively with others to implement them.

The US-AEP program comes to an end but will leave behind a wealth of knowledge and training, numerous models for replication and innovative partnership building experiences that can continue to be a source of inspiration and information to many future and on-going efforts on environmental management.

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