LINKING SCIENCE AND TECHNOLOGY TO

Woman's Needs

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In September 1995, more than 180 governments signed the Beijing Platform for Action at the Fourth World Conference on Women. Five years later, a special session of the United Nations General Assembly will review progress achieved and obstacles encounterd. This booklet offers examples of how science, engineering, and technology intersect the critical issues articulated in the Platform.

Women 2000: Beijing Plus Five
12 Critical Areas of Concern

1. POVERTY
Develop macroeconomics mechanisms to improve access to economic resources.

2. EDUCATION AND TRAINING
Ensure equal access to education and promote life-long education and training for girls and women.

3. HEALTH
Increase women's life-long access to affordable, appropriate, and quality health care and to information dealing with maternal mortality, sexually transmitted diseases, HIV/AIDS, and sexual and reproductive health.

4. VIOLENCE
Adopt and implement legislation to end violence against women, ratify the UN Convention on the Elimination of all Forms of Discrimination against Women, and encourage international cooperation to dismantle trafficking in women.

5. ARMED CONFLICT
Increase participation of women in conflict resolution at decision-making levels; condemn ethnic cleansing and rape as a consequence of war and a violation of human rights.

6. ECONOMY
Promote women's economic rights and independence, including access to employment and appropriate working conditions and control over economic resources.

7. DECISIONMAKING
Ensure women's equal access to and full participation in public sector power structures; increase women's capacity to participate in decision-making and leadership positions.

8. INSTITUTIONAL MECHANISMS
Create and strengthen national bureaucracies to ensure that the advancement of women is vested in the highest possible level of government.

9. HUMAN RIGHTS
Promote human rights of women by fully implementing all human rights instruments, especially the Convention on the Elimination of all Forms of Discrimination against Women.

10. MEDIA
Promote a balanced and non-stereotyped portrayal of women in the media.

11. ENVIRONMENT
Integrate gender concerns and perspectives in policies and programs for sustainable development.

12. THE GIRL-CHILD
Eliminate discrimination against the girl-child: enforce rights to succession; eliminate female genital mutilation, son preference, and economic exploitation of child labor; and strengthen the role of the family in improving the status of the girl-child.

Preface

Dr. Shirley M. Malcom

Head, Directorate for Education and Human Resources Programs
American Association for the Advancement of Science

Worldwide, countries are facing environmental, health, energy, and many other challenges. Women experience these problems in different ways, often bearing more than their fair share of the burdens for meeting the day to day needs of their families. This may mean a personal struggle to find fuel and water, to grow food and find medicines from the forest, or to find employment for wages, while maintaining full responsibility for the workings of the household. While countries around the world strive to meet their needs for sustainable human development, women scientists and engineers are needed to work alongside their male colleagues to solve these problems. Women scientists and engineers have made significant contributions in many of these areas; however, many more are needed in positions of authority to research and solve these problems. A more diverse group of women scientists and engineers, representing all of the cultural, racial, ethnic, and religious groups, are needed who can address the challenges that affect the planet, nation, states, communities, and families.

International conferences have identified problems and formulated recommendations that recognize the urgency of increasing the participation of women in the sciences and engineering. Among these was the United Nations Fourth World Conference on Women and NGO (Non-Government Organizations) Forum that took place in Beijing, China, in September 1995. With 36,000 women in attendance, the event produced a Global Platform for Action for raising the status of women and provided an unprecedented opportunity to forge alliances among thousands of delegates from every region of the world. In June 1999 the world science community came together at the UNESCO World Conference on Science (WCS). In its report, WCS was clear and unequivocal in affirming the need to address obstacles that affect women's full participation in science and engineering and to provide full access to women at all levels, including the highest levels of decisionmaking related to science and technology.

The Platform For Action from Beijing was one of the strongest policy statements promoting women's advancement ever made by the international community. Beijing Plus Five, to be held in New York City in the year 2000, is the follow-up meeting to the United Nation's Fourth World Conference on Women. It will consider the outcomes and progress made in each of the countries on advancing the status of women and girls.

Women's needs for such things as clean water, safe food, health care, employment, education, and training have been outlined in all of the women's conferences, including Mexico City, Copenhagen, Nairobi, and Beijing. However, an understanding of the science and technology connections to meeting these needs and the necessity for women scientists and engineers to participate has been slow to build. As we enter the new millennium, science and technology must be raised to greater visibility on the agenda for women's action. This booklet offers examples of how science, engineering, and technology intersect the critical issues articulated in the Platform. It also profiles some of the women who are changing the face of science and technology throughout the world.

Shirley M. Malcom

Science, Technology, and Women

In the modern world, access to and control over science and technology play a major role in determining which nations—and which people within nations—are rich or poor.

In the future, science and technology will likely play an even larger role in the creation of wealth as biotechnology and communications industries, among others, continue to grow. Because of this, more attention must be paid to the role science and technology can and does play in shaping the lives of women.

Many studies have documented the inequalities faced by women in the science, engineering, and technology fields. Though some progress has been made, the inequalities remain and are rooted in history. Women were disadvantaged more than men by the negative impacts of the agricultural and industrial revolutions.

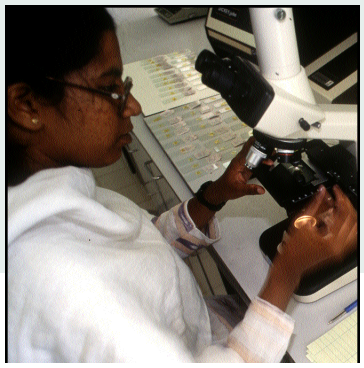

Photo © FAO

While new technologies reduced the need for unskilled labor, social barriers prevented women from receiving the education and training needed to take advantage of new economic opportunities. We now run the risk of entering into a new technological revolution based on information, communication, and health technologies, without having learned any lessons from the past. Women's limited access to training continues to be a problem throughout the world.

Another barrier is the belief that men are better suited to highly skilled tasks and are better able to handle advanced technologies than are women. This attitude persists in spite of visible achievements by women in science and technology. If women are to receive the full benefits of economic development, then we must change the way we view women's and men's roles, both within and outside the mainstream of science and technology.

We must strive to ensure that women in the twenty-first century take their rightful place in shaping their societies and share in the benefits of progress. We need action on two fronts: strengthening the role of women in mainstream science and technology and highlighting the importance of the traditional knowledge that women bring to these fields.

Photo © FAO

First, we must work to change attitudes towards women's roles in science and technology—on the part of men, and equally important, on the part of women themselves. An essential step in this process is to highlight the significant role that women have always played in advancing scientific knowledge and technological innovation. Though historically women have played an important part in these technological revolutions, their relatively low status in society prevented them from gaining fame or benefit from their innovations. Because women were unable to take out patents many had their male relatives or acquaintances take credit for their work. We need to highlight women's lost heritage as technological innovators to erase the myth that they are not good at or interested in science and technology.

A related issue is that of women's traditional technical knowledge and innovation. This includes the everyday processes of experimentation and adaptation in agriculture, healing, and other areas that have gone on for centuries in every part of the world. Much of this activity has been unrecognized by the scientific mainstream. However, the logical and consistent methods of problem solving and experimentation that are used by women, who are the custodians of much of this indigenous knowledge, form frameworks of understanding that can inform science and technology. Recognizing these "alternative" forms of innovation will help ensure that women's extensive knowledge and contributions are valued appropriately.

Individual efforts to strengthen the role of women in mainstream science and technology and to highlight the importance of women's traditional technical knowledge will enhance and enrich our world in many ways. Women are likely to gain the most from processes that join these two areas together and support them with policies that are sensitive to meeting women's needs.

There is a clear correlation between a young women's education and later reproductive health. For young women, just four years of education have been shown to correspond to a 30 percent decrease in childbirths and a 50 percent decrease in infant mortality rates. (Source: FAO)

Photo © FAO

Gelia Castillo,

Gelia Castillo is a specialist in rural sociology and an early pioneer in the concept of making the people of a community more active as agents in development. She has devoted her life to teaching, writing, and travel in more than 40 countries around the globe. As a social scientist who emerged from a poor Filipino background, her ideas have influenced and inspired thinkers, policymakers, and decisionmakers in government, international development, and academic circles.

Castillo has accumulated a large collection of work on topics ranging from rice and potato farming to agricultural school administration and community development. Of her three books, *Beyond Manila* is her most famous and best encapsulates rural Filipino life. It combines the issues of income distribution, employment, labor, education, and migration. In the book she underscores the definition of a "household," saying that the role of women and children contributes greatly to the dynamics of society.

Castillo believes in giving back to society all the good that life has given her. Her projects and causes have bearing on people's lives.

It was Gelia's father (who never went to college) and his household that has had the most profound impact on her life. Raising his family in a bamboo hut, he sacrificed land for her education and convinced her that academic achievement would be the key to her future.

His faith was well-founded; his daughter went on to a distinguished career, most prominently as Professor of Rural Sociology at the College of Agriculture, University of the Philippines.

Castillo believes in giving back to society all the good that life has given her. Her projects and causes have bearing on people's lives. Like many successful women, she has also had to balance her family life with her career. Married with three grown children, her husband supported her work and one of her daughters has become a sociologist.

Castillo's public speeches refer frequently to the Filipino cultural trait called the Bayanihan spirit of mutual help, represented by ordinary people carrying on their shoulders a thatched hut held by bamboo poles.

This article is based on a profile of Gelia Castillo that was originally published in 1995 in the IDRC publication entitled "In Person: Profiles of Researchers in the Africa, Asia, and the Americas." Material from this publication is reproduced here with the kind permission of Canada's International Development Research Centre.

Women in Filipino fishing villages play an important part in marketing the catch brought in by their men folk. In Luciente, a fishing village in Pangasinan province, women help to unload the catch from the bancas, motorized fishing boats used in the open sea. In the photo above, fish are weighed by a monitor, then taken to market by village women.

Better Life Options for Young Girls and Women

Photos © FAO

The Better Life Options program is a global initiative of the Centre for Development and Population Activities (CEDPA) to challenge gender inequity and expand life options of girls and young women. The program promotes opportunities for girls and young women ages 12-20 that enhance their choice with regard to fertility, education, health, employment, and civic participation.

Youth-serving NGOs in host countries collaborate with CEDPA in the program. Support is provided by major private multi-lateral organizations including the United Nations Population Fund (UNFPA) and the World Bank.

The program was founded in 1987 to address the special development needs of the girl child. Since its inception, the program has helped more than 500,000 girls through 46 projects in 14 countries to start on the road to a better future.

The program currently serves girls and young women in India, Nepal, Pakistan, Mexico, Guatemala, Ghana, Nigeria, Kenya, South Africa, and Egypt.

TOOLS

The Choose A Future! manual developed by CEDPA can be used to educate girls on issues of personal development, health and reproductive education, legal rights, career planning, and leadership development.

CEDPA has also developed a framework for participatory evaluation, which is being used by organizations to develop new directions for their programs by involving the girls themselves.

INSTITUTION BUILDING

Better Life Options Centers have been established in India, South Africa, Mexico, and Guatemala to provide technical assistance and training to other organizations so that their projects serve as models for replication. CEDPA provides technical assistance to large networks such as Christian Children's Fund, India and PLAN Nepal to incorporate programs for young women. This has helped to maximize impact with very little financial input from CEDPA.

CEDPA conducts annual three-week Youth Leadership workshops in Washington, DC for managers of youth programs and in-country workshops for implementors of programs. Since the workshops started in 1992, 224 youth leaders have been served.

ABOUT CEDPA

The Centre for Development and Population Activities (CEDPA) is a women-focused nonprofit international organization founded in 1975. CEDPA's mission is to empower women at all levels of society to be full partners in development.

CEDPA's strategies for empowerment include building the capacities of development institutions and networks, mobilizing women's participation at the policy level, linking reproductive health services and women's empowerment, and making youth an integral part of the development agenda. All CEDPA activities are designed to advance gender equity.

Working with partner nongovernmental organizations and networks in more than 37 countries, CEDPA designs, implements, monitors, and evaluates projects in family planning and reproductive health, family life education, women's participation in empowerment, youth services, and international advocacy for women and girls. A series of training manuals for institution-building and service delivery compiles CEDPA's people-centered approach to development.

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Flossie Wong-Staal, AIDS Researcher

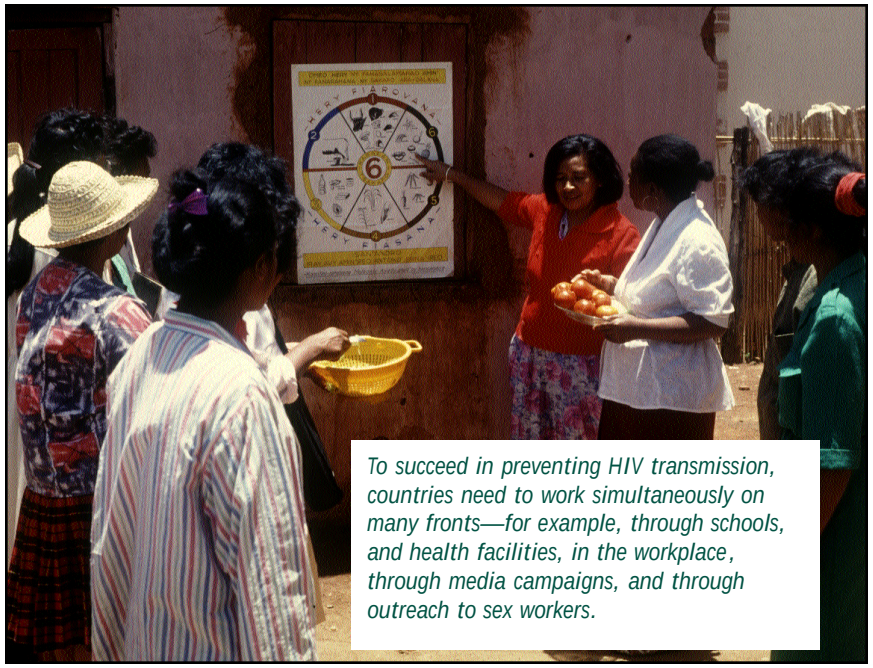
Flossie Wong-Staal is a leading pioneer in the fight against Acquired Immune Deficiency Syndrome (AIDS) and the retrovirus that causes it. Listed in 1990 by the Institute for Scientific Information as the top woman scientist of the past decade and the fourth-ranking scientist under age 45 (she was born in China in 1947), Wong-Staal is recognized today as one of the world's authorities in the field of virology.

Her education included magna cum laude undergraduate studies in bacteriology in 1968 and a doctorate in molecular biology in 1972, both received at the University of California-Los Angeles. She held a post-doctoral fellowship at the University of California-San Diego Medical Center in the early 1970s and served as Section Chief of Molecular Genetics of Hematopoietic Cells in the Laboratory of Tumor Cell Biology at the National Cancer Institute in Bethesda, Maryland, from 1973 to 1989. Relocating back to California in 1990, Wong-Staal became the director of the Center for AIDS Research (CFAR), funded by the National Institutes of Health.

Wong-Staal's mission is to gain greater knowledge of the virus that causes AIDS while at the same time working towards its ultimate destruction.

Wong-Staal's mission is to gain greater knowledge of the virus that causes AIDS while at the same time working towards its ultimate destruction. In studying AIDS and the HIV virus, Wong-Staal discovered that in an infected individual, even a person without symptoms, the virus copies itself a trillion (10+12) times every day, killing perhaps a billion cells, all of which are replaced—at least at first. While the body can hold out against the virus for quite some time, it is eventually worn down bit by bit. And, with trillions of copies each day, enough subtle variations are created that the virus starts to mutate slightly. Wong-Staal and her colleagues realized that these mutations made the virus into a moving target, or, in scientific terms, a "quasi-species." The constant simmering of new quasi-species within the host means that by the time the host develops antibodies they may already be obsolete. For this reason, as her knowledge of the retrovirus deepened, Wong-Staal became convinced that gene therapy—the manipulation of genetic material in either the host or the virus to make the host stronger or the virus weaker—was the most promising approach. With HIV, the effort is on weakening the attacker. The advantage of gene therapy is that it has the potential to keep doctors and patients one step ahead of the mutations. Wong-Staal and her colleagues are doing all they can to stay that one step ahead.

Photo © FAO



To succeed in preventing HIV transmission, countries need to work simultaneously on many fronts—for example, through schools, and health facilities, in the workplace, through media campaigns, and through outreach to sex workers.

Women, Health, and Violence

One out of every three women worldwide has a serious long-term health problem linked to beating, rape, or other violence.

This startling fact was highlighted by a report issued by researchers at The Johns Hopkins University School of Public Health and the Center for Health and Gender Equity.

The researchers report that victims of violence were found to be at higher risk for many long-term health problems.

"What is striking is how similar the problem is around the world," says Lori Heise, Co-Director of CHANGE and lead author of the Population Reports issue, *Ending Violence Against Women*, published by The Johns Hopkins Population Information Program. "Without exception, women's greatest risk of violence comes not from 'stranger danger' but from men they know, often male family members or husbands."

Among findings culled from over 500 studies of domestic abuse:

- Many women conceal their plight. In surveys 22% to almost 70% of abused women said that they had never told anyone about their abuse before being asked in the interview.
- Rates of abuse can vary greatly in neighboring areas. Differences among regions, towns, or villages in the same country can be greater than differences among countries.
- Beyond immediate injury, violence often leads to serious long-term health problems, including chronic pain, physical disability, drug and alcohol abuse, depression, and suicide attempts.
- The physical and psychological impact of different types of abuse and multiple episodes over time appears to be cumulative and can persist long after the violence has stopped.
- Children of battered women face a greater risk of low birth weight, malnutrition, behavioral problems, and infant death in some settings.

Although the problem is pervasive, public health research can help us understand the problem and pose research-based approaches for ending the problem.

For more information or to read the full report, see *www.jhuccp.org/pr/l11edsum.stm.*

Photo © FAO

War and civil strife have resulted in health emergencies in many countries, spreading undernourishment and even starvation throughout civilian populations. In the photo above, farmers stand in line for seed in the aftermath of civil war in Rwanda.

Joyce Robinson, teacher

Teacher, communications executive, and the first Jamaican to head the Jamaican Library Service, Joyce Robinson has contributed to the changing face of her country during her lifetime. She led the national literacy campaign in the 1970s in which some 200,000 Jamaicans learned to read and write; and, from UNESCO, came an International Literacy Prize for the campaign's excellent results. Although her honorary law degrees, lifetime achievement awards, and international travel opportunities are all very much appreciated, her greatest satisfaction comes from knowing that she has made a contribution to her country's development.

Dr. Joyce Robinson has spent 52 years in the field of literacy, education, and training, and, her work has been recognized in her native Jamaica and beyond. Her career has had four distinct yet interrelated phases: library, literacy, television, and youth training.

"Dr Rob," as she is affectionately known, began as a student teacher at 16 years of age and planned to study medicine. After completing Cambridge exams, Joyce worked voluntarily at the Young Mens' Christian Association in Trench Town before moving to the Black River High School in St. Elizabeth. After 3 years as a volunteer in the parish, Joyce was invited to join the Jamaica Library Service staff at its headquarters in Kingston. Within a span of 10 years, she became the first Jamaican Director of Library Service, the dreams of being a doctor long ago superseded by the "excitement of training to become a librarian."

More than a mere repository of printed reading material, the library was the center of social life in rural communities. It was where many budding Jamaican artists had their first exhibitions. Master potter Cecil Baugh and famous Jamaican painter Karl Parboosingh first exhibited their work in libraries.

The library service experience prepared Robinson for the demands of the job as head of the revitalization of the national literacy program in 1973 and for the other jobs that followed. Robinson's nonpartisan approach to work is a trait admired by all. Few were surprised when, in 1973, the national literacy program JAMAL ran into hard times, then Prime Minister Michael Manley asked Joyce Robinson to rescue the project that aimed at getting every Jamaican to read and write. One year later, in recognition of her individual personal contribution to maintaining a united Jamaica, Robinson was given the Unity Award.

During Robinson's 8-year JAMAL stewardship, over 200,000 Jamaicans learned to read. The success was largely due to the network of volunteers created along the lines of that used by the library service. Robinson and her staff used her library service contacts to maintain the network of 13,000 volunteer teachers, and 1500 paid officers conducting 8000 classes across the island. The network of community and church leaders and public- and private-sector officials was even more impressive when they succeeded in starting classes in the workplace.

Early in JAMAL's reorganization, Robinson visited Cuba and observed its post-literacy program, which was effectively using radio to reach learners. On her return, she spearheaded the creation of radio and, later, television programs.

When she left JAMAL for the Jamaica Broadcasting Corporation in 1981, Robinson had indeed rescued the Literacy Program. It won the Press Association of Jamaica special award for developmental work and, later, won a UNESCO Literacy Award for its innovative nature and impact in increasing the levels of literacy.

In 1982, Robinson became Managing Director of the Human Employment and Resource Training Programme (HEART), a project out of Jamaica House (the office of the Prime Minister) to mobilize and offer skills training for school-leavers. In the 11 years under Joyce Robinson, the HEART Trust grew from a one-room facility at the Prime Minister's Office with one secretary and a part-time administrative assistant, to an organization with a budget of US $100 million providing training, development, and employment for over 30,000 young people.

Robinson saw the setting up of eight HEART Academies providing training for the hospitality, construction, cosmetology, garment, business, and agriculture sectors. The HEART school-leavers' program was also started to find training opportunities and placements in the private sector for young people who had left school with inadequate job skills. Robinson also managed the implementation of the Solidarity Program. The project offered business training and granted loans through a self-start fund on the basis of character references. At its inception, over 4200 projects were established to help unemployed youth between the ages of 17 and 30 years. More than 35,000 people were assisted to become entrepreneurs.

Photo © FAO

Around 15 percent of the world's population, more than 153 million young men and women, remain illiterate. Of those, 57 million are male, but 96 million are female. In 40 countries, less than 25 percent of girls go to secondary school. (Source: FAO)

This article is based on a profile of Joyce Robinson that was originally published in 1995 in the IDRC publication entitled "In Person: Profiles of Researchers in the Africa, Asia, and the Americas." Material from this publication is reproduced here with the kind permission of Canada's International Development Research Centre.

Gertrude S. Aboagye, agriculturist

Photo © FAO

Aboagye is firmly convinced that improving the genetic qualities and attributes of livestock breeds is essential to increasing animal productivity.

Gertrude S. Aboagye, a specialist in cattle production and animal breeding at the University of Ghana, spent four months in 1997 at Food and Agriculture Organization of the United Nations (FAO) headquarters in Rome as a Visiting Scientist working with the Animal Genetics Resources Group. Aboagye hopes that her involvement in developing a global animal genetic resources management programme will help Ghana and other countries to reach a goal they all share—to improve the productivity of their national livestock.

Gertrude S. Aboagye was born in Accra, Ghana in 1947. After studying agriculture at the University of Ghana, she went to Canada to do a Masters degree in Animal Breeding (Cattle) at the University of Guelph, Ontario. In 1976 she moved back to Ghana and began teaching in the Department of Animal Science at the University of Ghana. She became Senior Lecturer in 1993.

Aboagye teaches cattle production and animal breeding—her specialty—to undergraduate students. She often takes her students on field trips to nearby farms to study cattle and other livestock. She finds her students very well informed and concerned about how to improve their country. Many of them go abroad to study and return to Ghana to do graduate work.

Aboagye is firmly convinced that improving the genetic qualities and attributes of livestock breeds is essential to increasing animal productivity. She says that the Ghanian government has made substantial progress in that direction by implementing a new national agriculture and livestock policy. An Animal Breeding Consultant Team has been set up in Ghana, funded by the World Bank. Aboagye works with this team on behalf of the government in addition to her university duties.

At FAO, Aboagye worked with the Animal Genetics Resources Group, which is developing FAO's Global Programme for the Management of Farm Animal Genetic Resources. This program has a country-based global infrastructure to help countries design, implement and maintain comprehensive national strategies for the management of their animal genetic resources. The Domestic Animal Diversity Information System (DAD-IS) is being developed as the superstructure for the different databases, documents, and tools related to animal genetic resources in FAO's Global Programme. One of the most important features of DAD-IS is the capability to transfer and collect information through the Internet.

Aboagye worked mainly on the Breeds database in DAD-IS, proposing improvements in its structure and developing a manual to help national coordinators enter and update their country's data in a uniform manner. As an informal contact, she submitted her country's breeds data for entry into the Global Databank, which is visible in DAD-IS. Her involvement in the programme at this very high level has made her appreciate the magnitude of the problems associated with the management of global animal genetic resources. She would like to believe that her own country will benefit from the knowledge and experience she has acquired during her stay in Rome as a Visiting Scientist. Gertrude Aboagye also belongs to the Ghana Society of Animal Production, Ghana Science Asssociation, Ghana Animal Science Association, Women in Science and Technology, and the University Teachers' Association of Ghana.

This profile was excerpted with permission from an article on the Food and Agriculture Organization of the United Nations website. The article can be found at http://www.fao.org/NEWS/PROFILE/PF9801-e.htm

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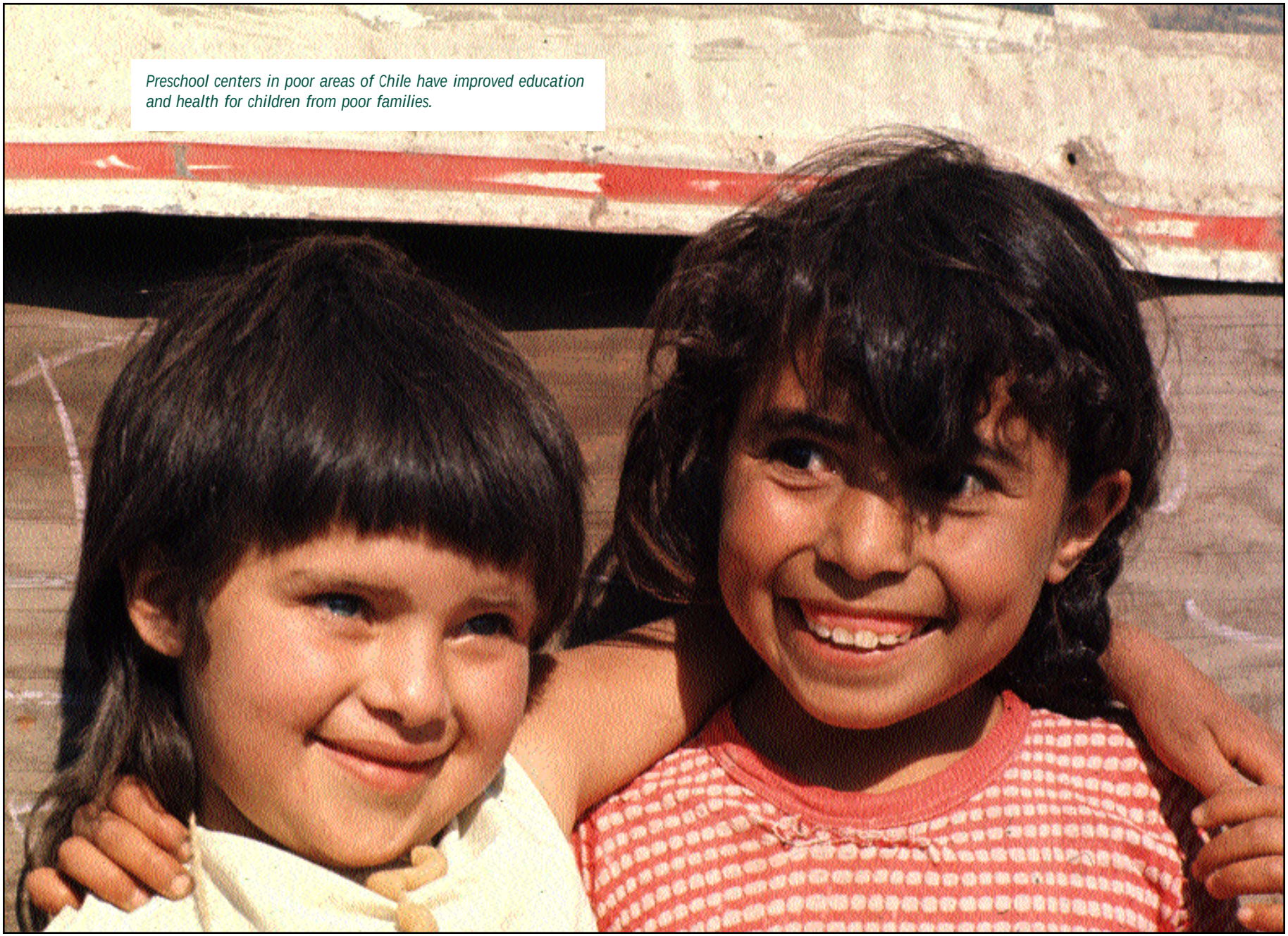

Preschool centers in poor areas of Chile have improved education and health for children from poor families.

Photo © UNESCO

Community-run Preschools in Rural Chile

"Give a man a fish and he eats for a day; teach a man to fish and he eats for a lifetime."

This is an adage that exemplifies the success of the Centro de Estudios y Atención al Niño y a la Mujer (CEANIM) (Center for the Study and Care of Children and Women) in designing a self-sustaining preschool program for the marginalized families in the barrios of Chile. In the poor communities preschool education and childcare development are rare, and government-funded programs have limited capacity, and privately run programs are out of reach for the poblaciones (people on the outskirts). To help remedy the situation, CEANIM developed a model to enable poor communities in Chile to run their own preschool centers.

The alternative, community-run preschool centers, known as CCAPs (Centro Comunitarios de Atención Preescolar), give children a good start in life by providing a stimulating educational environment and promoting proper nutrition, measures that later help reduce failure and drop-out rates in elementary school.

What guarantees such a successful education program? Mothers of the children become "community agents" in the development, administration, and organization of the centers. They have direct involvement in teaching the children. The mothers attend workshops to learn about socialization, health, hygiene, and nutrition. The centers are a low-cost alternative for these mothers, who are required to give one period of duty per week and bring in cleaning supplies once a month.

Begun with support from the International Development Research Center, a public corporation created by the Canadian government to help communities in the developing world find solutions to social, economic, and environmental problems through research, CEANIM developed the model with a mission for expansion and self-sustenance among the CCAP communities. CEANIM oversees the operation of the centers in three stages: during the first year, CEANIM establishes the center and ensures its basic functioning; during the second year, mothers and the community as a whole teach at and run the center, in preparation for operating the center themselves, with resources provided by CEANIM; and in the third stage, the center functions autonomously, with occasional help from CEANIM to solve specific problems.

In this way, the power ordinarily given to institutions to hold sway over people's lives is translated directly into empowerment for the women of the Chilean barrios, significantly increasing their confidence and giving them skills as administrators and educators. An evaluation of the program supported these facts, and indicated that the quality of the children's education was improved when mothers were involved. Studies also showed that children's verbal communication and gross motor skills also improved. Children at these centers were well prepared to enter the formal school system.

Since 1979, CEANIM has established more than 21 preschool centers in poor areas in Chile, serving more than 10,000 children and 6800 mothers. Among the results are improved education and health for children from poor families. One evaluation revealed that more than 80% of the children fall within the "normal" range during testing for gross motor skill development, nutrition, and school attendance. These results compare favorably with other studies indicating that 60% of rural children and 40% of urban children who do not benefit from preschool education fall into the "at risk" category when tested for the same factors. Furthermore, it was found that the longer children participated in the CCAP program, the better the results.

Until 1995, the CCAP program was financed almost exclusively by international organizations. Since 1995, Fundación INTEGRA, a private sector organization lead by the wife of the Chilean president, has gradually increased its financial support and is now financing 10 preschool centers. Eight more of the 21 centers have established themselves as private operations within their communities, independent of CEANIM, which is one of the program's stated objectives.

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Photo © FAO

One of the goals of TWOWS is to work to strengthen research efforts of and training opportunites for young women scientists working and living in Third World countries.

CEANIM has significantly influenced program development at both the state-run La Junta Nacional de Jardines Infantiles (JUNJI) and its Jardines Familiares program, which provides day care for some 95,000 children, as well as at Fundaciun INTEGRA's Centros Comunitarios Rurales, attended by approximately 50,000 children.

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An International Forum to Unite Women Scientists

The Third World Organization for Women in Science (TWOWS) is an independent, nonprofit, and non-governmental body based at the offices of the Third World Academy of Sciences (TWAS) in Trieste, Italy.

TWOWS emerged from a conference convened by TWAS and the Canadian International Development Agency in Trieste in early October 1988. The conference, entitled "Conference on the Role of Women in the Development of Science and Technology in the Third World," included as participants 218 leading women scientists from 63 developing countries, who recommended that a study group be set up to explore the possibility of creating the organization. TWOWS was officially launched in Cairo, Egypt, in February 1993 at its first General Assembly, and a constitution was adopted.

TWOWS is the first international forum to unite eminent women scientists from the Southern Hemisphere. Its aims include: strengthening research efforts and training opportunities of young women scientists working and living in Third World countries and promoting the recognition of their scientific and technological successes; surveying and analyzing the status and prospects of women in science and technology in the Third World; improving access to educational and training opportunities for women in science and technology and promoting women's participation in the decision-making processes, both at national and international levels; increasing the scientific productivity and efficiency of women scientists in the Third World; promoting collaboration and communication among women scientists and technologists in the Third World and with the international scientific community as a whole; and encouraging other international organizations to increase their activities concerned with promoting the role of women in science and technology in the Third World.

Full membership is open to women scientists and scientific institutions in the Southern Hemisphere. Currently, there are more than 2000 full individual and 29 full institutional members from 87 developing countries. Associate memberships are open to men and women from both the Northern and the Southern Hemispheres.

For more information, e-mail twows@ictp.triest.it.

Pilar Cereceda, Clean, Fresh Water in Chile

Photo © FAO

Returning to the tiny seaside village of Chungungo (population 330) in northern Chile is quite often an emotional experience for Dr. Pilar Cereceda, researcher and geography professor at the University of Chile in Santiago.

When Cereceda first arrived to begin her research project, Chungungo was just one of hundreds of villages in the region that had no local source of fresh water. The village sits in Chile's north coastal desert, just south of the Atacama, the most arid desert in the world. The inhabitants used to have water trucked in from 40 kilometers away, at a cost of US $8 per 1000 litres. The average family had only 14 litres a day and, during drier periods, just 3 litres. Now, thanks to the introduction of an innovative fog-catchment system, the village has a fully functioning local water-supply system. The change is remarkable. Now that fresh water is more plentiful, local gardens burst with lettuce, tomatoes, beans, corn, even flowers. "When I visit, people stop me just to show me the shower in their homes!" says Cereceda.

The "miracle" of clean fresh water for the residents of Chungungo came about through the introduction of large fog collectors: "a kind of volleyball net, which captures the fog [called camanchaca], typical of northern Chile," explains Cereceda who, together with Dr. Robert Schemenauer of Environment Canada, has directed and advised on the installation of these nets in other sites in Chile, Ecuador, Peru, and the Arabian Desert.

The process involves the installation of polypropylene mesh nets, 12 meters long and 4 meters high, situated high in the mountains above the village. Fog, which is a regular phenomenon in the area, passes through the mesh and leaves behind droplets that trickle down to a trough that carries the water to a storage tank in the village.

The 75 fog collectors built by the Chilean Forestry Service (CONAF) near Chungungo feature 3600 square meters of mesh that, over the past 2 years, have captured an average of 10,000 litres of water daily. Chungungo has gone from being a village barely able to scratch out an existence to a prosperous community that even attracts holiday visitors. During the high season, the population of Chungungo grows by over 500, with attendant economic benefits to the local community. New houses are springing up.

CONAF equipped one hectare with drip-irrigation systems and handed out seeds, plants, and tools to begin farming in the area. The change in the population's approach to agriculture has been slow, mainly because for many years the migrant fishermen who live here traveled constantly all over the Chilean coastline in search of good fishing. But now, some families have started to obtain successful results from their gardens. Some women have also received help on how to clean and sell fish, thus increasing their income considerably.

There has been an extraordinary change of attitude in the people. "They realize that previously they had lived totally abandoned and that now they have the right to demand help from the municipal and regional authorities. They have confidence and real expectations. After

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Photo © FAO

receiving water and now electricity from the National Power Network System, people are ready to install a television-signal repeater antenna, something they never dreamed of before!"

Surprisingly, the idea of using fog collectors to provide fresh drinking water is not new. While reviewing old research studies, Cereceda and her colleagues discovered that, in 1960, University of Northern Antofogasta physicist Carlos Espinosa had built nets to capture fog water. His work, in turn, was based on even earlier studies in other countries. Physicist Espinosa encouraged Cereceda and her team to continue this work. Together with anthropologist Horacio Larraín, the researchers were determined to put this idea into practice and spare thousands of people a lifestyle of poverty and illness caused by lack of water.

The experience gained during her work in northern Chile helped Cereceda understand the importance of having community involvement early on in any research project. "In Chungungo, we did not do this at first. It was our first experience; we were afraid of raising their hopes too high and then disappointing them. But when the community realized that we were trying to help them get water, we felt that they had come to understand that the water was for everyone and that it was an important resource they had to cherish and take care of. The participation of the community in learning to use water wisely and avoiding needless waste is obviously very important because the quantity of water collected is not limitless; it varies with the weather conditions."

Author of more than a dozen books, on such topics as Chile's geography, environmental risks, hydrography, and the Chilean landscape, Professor Cereceda was awarded an Environmental Citation by the Canadian Meteorological and Oceanographic Society in 1993. She confesses that most fulfilling of all is "helping make possible the miracle of water, thus changing the quality of life of many families. Imagine what they feel like when, all of a sudden, they can take a shower in those desert areas where the summers are incredibly hot; what they feel when they cook their meals, clean their house, wash their clothes."

In addition to her books, Professor Cereceda has explained her ideas and shared her knowledge on coastal fog as a hydrological resource and coastal fog applications at numerous seminars and conferences around the world: in Chile, China, Kenya, Morocco, the Philippines, and South Africa, among other places.

Conducting research in South America can be difficult. "We normally lack more advanced instruments. Fifteen to twenty people share one secretary and a messenger boy, and we end up doing everything ourselves: from going out and buying pens and paper for the computer printer, to picking up deliveries at customs. But we have a great strength: that of our students and assistants who, brimming with youthful enthusiasm, prod us to achieve ever higher goals."

Her teaching role gives her immense satisfaction. She enjoys going out to the hills with her students and teaching them geography on site. "It is during field work where you can really enjoy the phenomena that we teach. In class, all you have is a blackboard, a transparency, or slide projector, everything is static. In the countryside you feel, you see, and you hear the phenomenon of nature. There you can talk, argue; you don't teach, you live the moment, and you share the natural event. When that happens, it's not the teacher who teaches, but the students and nature who teach the professor."

Pilar Cereceda has converted her experience into numerous slide shows and television films. She has also taught environmental protection and Chilean geography on the television education system, TELEDUC. In Chile, her project is acclaimed as "the first project from a Chilean university to be exported to other countries and benefit people throughout the world."

This article is based on a profile of Pilar Cereceda that was originally published in 1995 in the IDRC publication entitled "In Person: Profiles of Researchers in the Africa, Asia, and the Americas." Material from this publication is reproduced here with the kind permission of Canada's International Development Research Centre.

Solar Energy in Refugee Camps

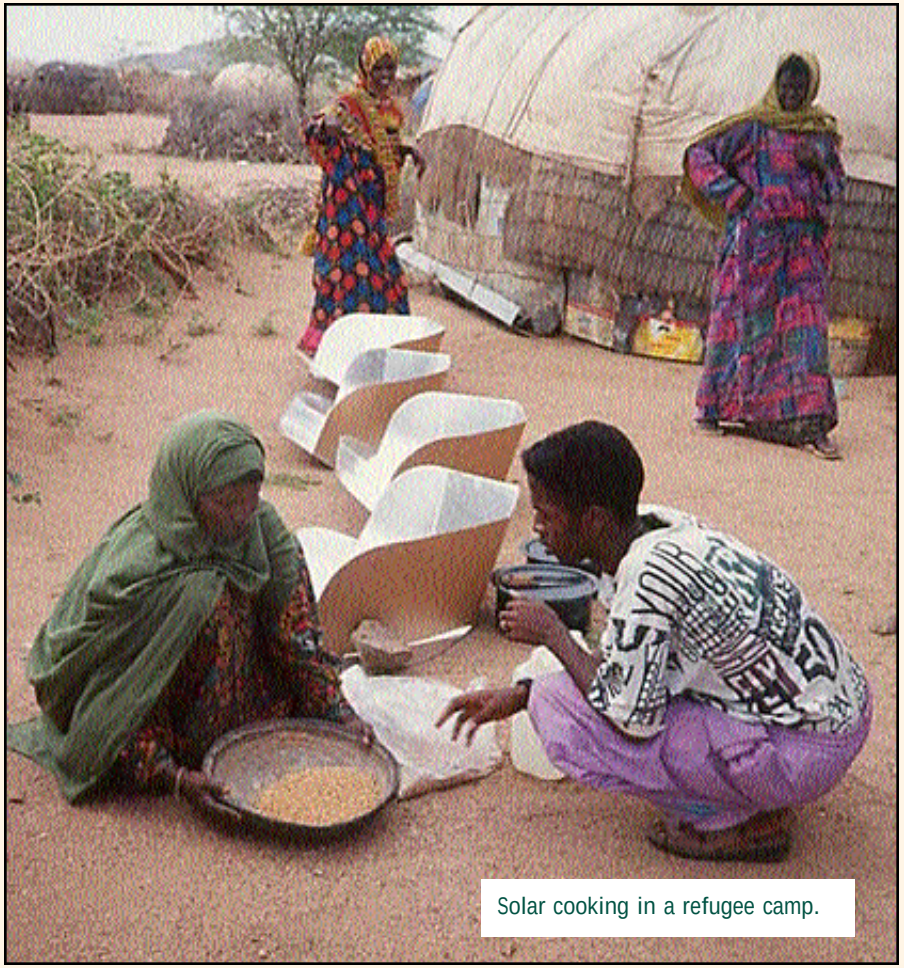
Solar Cookers International (SCI) has been sponsoring extensive solar cooking work in Kenyan refugee camps. More than 15,000 families have attended workshops and returned home with their own solar cooker. Thanks to a new cooker design, it costs only US $10 to supply each of these families with a solar cooker, a black pot, a supply of trial food, and instruction on how to use their new cooker. Follow-up visits have revealed a high level of use. Families report now that they no longer have to trade their scarce rations for firewood in order to have a way to cook the food that's left.

The Solar Cooking Project staff in Kakuma 1 refugee camp in northeastern Kenya consists of 32 trainers, three monitors, and one supervisor—refugees all. They are paid a small "incentive" or stipend in exchange for serving as the eyes, ears, hands, hearts, and minds of solar cooking promotion in the camp. In addition to training new solar cooks and distributing appropriate supplies and Cookits, the trainers also conduct follow-up visits to the homes of new solar cooks and lead follow-up meetings of each group of new trainees to provide additional tips, answer questions, and promote joint problem solving and recipe sharing.

The monitors coach the trainers, assist in trainings and group meetings, and are in charge of issuing and re-ordering supplies. The supervisor solves problems for the staff and keeps the project running in coordination with the camp management, Lutheran World Federation.

The staff makes replacement cooking bags available to those who need them and has recently begun to teach methods for reusing worn bags by converting them into mats, baskets, sturdy tote bags, ropes, traditional pot hangers (to keep food supplies out of the reach of rats), fans, and miscellaneous containers. A sleeping mat, larger and more comfortable than standard camp issue, has also been designed. Staff members also create new recipes to share with the community.

Although some project staff had never held a pencil before becoming trainers, they have learned to keep written records of trainings, home visits, and group meetings. They have also been trained in observing and recording usage of solar cookers.



Solar cooking in a refugee camp.

As teachers, neighbors, and camp residents, the Solar Cooker Project staff members are steeped in knowledge of camp life, the needs of the people, and the importance of solar cooking in their lives. Staff observations and suggestions are crucial to guiding policy as the project continues to mature.

According to their observations, people are gaining definite benefits from solar cooking, but in many cases use of the cookers

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is still spotty. The solar cooking benefits being realized include:

- fewer children or cooks getting burned
- solar cooking saves time to be spent on other useful activities
- solar cooks save on firewood, most of which is obtained by bartering their food ration, so more food is available
- food does not burn or stick to the pot, so people can eat all the food
- girls' work loads are lessened and they can go to school
- smaller families reap the maximum benefit, since they get smaller firewood rations
- fewer waterborne diseases
- tastier foods with all the vitamins
- less air pollution in compounds and shelters
- fences are not being destroyed in the hunt for firewood
- solar Cookits are portable and the energy used is free

Despite the refugee population's growing experience with these solar cooking benefits, old habits die hard, and wood is still commonly used. Low sales of replacement bags indicate that most families are not making maximum usage of their cookers yet. The project staff sympathize with the people who say they can't afford to buy new bags.

The staff reports that some families say that their Cookits or pots have been stolen, while others say their Cookits have been damaged by rain. Staff also reports that some families only use the cookers when firewood rations run out, while other families don't solar cook at all (but use the training-provided pot over a fire). The general staff observation is that those families who do use their Cookits frequently gain the most benefits.

To boost usage, the trainers brainstormed ideas for activities they can pursue:

- setting a good example by regularly using their Cookits
- demonstrating new recipes to interested families
- discussing the advantages of solar cooking at every opportunity
- promoting solar cooking through songs and dramatic skits
- sparking questions and dialogue by dressing in their project uniforms
- always carrying replacement cooking bags for those wanting to buy

The project staff is also involved in such ongoing and sensitive issues as the long-term, local sustainability of solar cooking in Kakuma. That is why they have learned to make Solar Cookits by gluing reflective paper to cardboard. They have recommended that families wanting a second or third CooKit should also make their own, as a way both of "sharing project costs" with SCI's donors and of transforming the refugees from recipients of charity to true owners of a technology that is integrated with their cultural skills. In addition, they have suggested that families earn replacement cookers when their old CooKits wear out by working on project activities such as painting pots and gluing reflectors.

Truly, the refugees who work as the Solar Cooker Project staff are the bridge between SCI and lasting solar cooking benefits in the lives of the refugees. It represents a low-tech application of solar technology that can be most useful in developing countries where most of the energy is used for cooking.

In developing countries, the traditional wood-fueled cookstove is at the heart of many rural households. However, constant exposure to excessive amounts of smoke can cause serious eye and lung diseases. With solar cooking, fewer children or cooks get burned.

This story was based on articles in the Solar Cooking Archives (http://solarcooking.org/), and reprinted with permission of Solar Cookers International. For more information contact:

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Palmira Ventosilla, microbiologist

Since touring the poverty of the Peruvian Sierra as a child, microbiologist Palmira Ventosilla has felt compelled to help improve the living conditions of the disenfranchised people of her country. In the neotropical town of Salitral, where Ventosilla has concentrated her efforts, the weather alternates between very dry winters and very humid rainy seasons, during which ponds form everywhere and act as breeding grounds for Anopheles mosquitoes. Over the years, local inhabitants have learned to live with the debilitating effects of the malaria (fever, chills, nausea, and muscle pain carried by these mosquitoes). But since the appearance of Falciparum malaria, chances increased that they would die of it. Yet the local people cling to two juxtaposing worlds that create constant health risks: valued traditional folk medicine and the national government that seeks to eliminate the mosquitoes by using harsh man-made chemicals.

Ventosilla and her team of researchers discovered a naturally occurring bacterium that is harmless to humans and animals, but kills Anopheles larvae. Though commercially available, the bacterium is expensive for developing countries. Ventosilla's team found an inexpensive way to develop the bacterium by growing it in coconuts and releasing it into ponds where mosquito larvae flourish.

The research was a success; the task of local community implementation was a challenge. Local people were suspicious of a "biological" grassroots approach and their responsibility to see to its success in the midst of daily, basic tasks of self-survival. But while the adults in Salitral were skeptical, their children were eager to learn and participate. An educational method developed by one of Ventosilla's colleagues provided the children with clear information about the malaria, mosquito breeding cycles, and production of the bacterium. Three other members of the team worked on a series of information sessions designed to reach the adult population. They had to convince the community of the potential harm, both to human beings and to the environment, of many chemical pesticides used by government employees. They had to offset deeply rooted prejudices and assumptions.

Ventosilla's colleagues efforts were so successful that the children proved to be brilliant teachers. After learning the technique, they took it home to teach their parents and relatives everything they learned. They showed their parents that the method is inexpensive, very effective, and not time consuming. Eventually, parents began to pitch in and help.

Several short educational videos were made. (This in itself proved to be a challenge, as the local people did not like to be filmed.) People began questioning their old methods. Once the entire community was reached, all three major schools of Salitral made room in their curriculum for the special biology course the program created.

While Ventosilla and her colleagues ultimately received the support of the ministries of health and education; they found the teachers the most receptive.

Ventosilla knows it is unrealistic to expect to wipe out malaria completely from her country, because of the prevailing climate and terrain. But she is convinced that if local families are able to kill the mosquitoes in their backyard, the chances of them or their families contracting malaria become slimmer. And if their neighbors do the same, the probability keeps getting smaller and smaller.

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...microbiologist Palmira Ventosilla has felt compelled to help improve the living conditions of the disenfranchised people of her country.

Photo © FAO

Women, Agriculture, and the Environment

Since the beginning of the 20th century roughly 75 percent of the genetic diversity among agricultural crops has been lost. Faced with the traditional responsibility of caring for one's family and making universal, practical use of resources, women are naturally at an advantage in their knowledge of the value and use of genetic resources for food and production.

In sub-Saharan Africa, women cultivate as many as 120 different plants in the spaces alongside men's cash crops. In the Andean regions of Bolivia, Colombia, and Peru, women develop and maintain the seed banks on which food production depends. In Rwanda, women are the traditional farmers of beans, known as the "meat" of the countryside, which provide one-quarter of the calories and almost half the protein that people consume.

Traditional women's gardens are models of sustainable land use. Women are likely to rely on perennial rather than annual vegetation and fertilize with mulch, manure, and crop residues. These kinds of home gardens provide sustained yields, yet cause minimal environmental damage over time. A study in Nigeria found that women who grow intensive home gardens may cultivate 18 to 57 plant species, including tubers, legumes, grains, and fruit-trees, in addition to raising dwarf goats and poultry. Mixed farming using crops and livestock is frequently the most sustainable form of agriculture.

Soil conservation planners have begun to recognize the value of local knowledge, particularly that of women. Projects are using low-cost techniques adapted to local conditions. For example, an agro-forestry project in Yatenga, Burkina Faso, relies on the harvesting of scant rainfall to keep fields and crops moist throughout the growing season. It has successfully combined a traditional technique of collecting water in small pits spaced across fields with the construction of rock banks following the shallow-sloping field contours—and much of the bank building is done by women. Crops in these fields can now survive up to two weeks of drought, producing larger and more reliable yields.

Yet the journey is not yet finished. While women are in the majority in providing the world's agricultural labor, only 15 percent of the world's extension agents are women. And the laborers themselves receive only 5 percent of all extension services.

Photos © FAO

In many households, women manage those components of the farming system that contain high levels of diversity, such as home gardens. Women's home gardens are often informal "experimental stations" in which they transfer, encourage and tend indigenous species. Home gardens also often provide vegetables and fruits that are the main source of vitamins and minerals essential to a healthy family diet. (Source: FAO)

Electricity in the Pacific

The experience of the NGO, APACE in the Solomon Islands, demonstrates the ways in which women prioritize the application of technology within their communities. APACE is involved in setting up hydro-electric generators in the Solomon Islands and has consulted women, who regularly cite electricity as one of their development priorities, in the implementation of the project. The women were jointly responsible for the generator's upkeep and, it has been said by project participants, were more insistent about maintaining the machinery and setting aside the appropriate funds for this purpose. Once the generator was installed, decisions had to be made concerning the distribution of the rather limited electricity in the village. Women indicated that their preference was for lighting in the communal kitchen. The new light sources in the communal kitchens then enabled women to produce foods and snacks for sale. With additional income and the means to expand their electricity source, it was debated as to what should next be electrified.

The women decided that the community would best be served by putting up lights on a boardwalk near the ocean where the young people congregate. There had been a troubling out-migration of the youth to the more exciting cities. The provision of light for nighttime social activities helped keep the youth in the village and retain the social fabric and economic stability of the community. Women recognized the need for social interaction, sports, village meetings, and so on, and saw electricity as a means of providing these activities.

In another village where decisions had to be made on spending additional income earned from a fishing project, the men wanted to spend the money on bigger boats and bigger motors. However, in discussions with the men, women made it clear that their priority for the community was electricity. They were interested in improving the quality of life in the community and enabling the children to do their homework in the evenings.

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Science Theatre in South Africa

Science Theatre is a creative initiative in South Africa aimed at bringing more girls and women into science and exploring the issue of gender in science and technology. Organized by a man and two women from the University of Stellenbosch and South African Women in Science and Engineering (SAWISE), the program uses interactive theatre to educate and engage children. The children are brought into Madame Trussaud's Museum of the Future where four women scientists are depicted. An absent minded curator guides them on their tour but frequently gets facts wrong. When this occurs the women scientists come to life to correct him and engage in discussions with the children. The women ask them what the world is like in the present, including what are the roles of women in science. Students are encouraged to ask questions.

The second part of the program investigated gender stereotypes. The setting is a kitchen where traditional roles are played out by a fictional family. The children play, the mother cooks, and the father returns home from work. A facilitator then stops the action and reverses the gender roles. Done in a humorous fashion, the acting leads to a discussion on possible solutions, collaboration and sharing of tasks and alternatives to fixed gender roles. Hung as a backdrop are posters of women scientists in South Africa for students to observe during the performance. They are also referred to in the performance. Pamphlets on university science programs are also handed out at the end of the performance.

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Women and Intellectual Property Rights

A facet of science and technology that has growing implications for women is the intellectual property rights regime. Women are frequently the custodians of biodiversity, have extensive knowledge of plants and animals, and manage natural resources and health care. It is often women who cultivate the crops and utilize the traditional medicinal knowledge. Yet their knowledge, which has been freely obtained, developed, and shared for centuries, is being increasingly threatened by western companies and the intellectual property rights regime which dictates that communal knowledge, and often forms of life, be privatized and owned. This privatization of women's knowledge often comes without adequate compensation to the women.

Furthermore, it can result in women being robbed of their ability to provide for their families and for their own livelihoods. Moreover, the proliferation of patenting by western corporations means that capital will flow in the form of fees from the south to the north.

As women are largely responsible for household food supply, health care, and other reproductive activities, and are engaged in numerous productive activities, they have a considerable interest in the issue of intellectual property rights. As such, they have been at the forefront in challenging an unfair intellectual property rights regime and particular claims. At the Fourth World Conference on Women, 118 indigenous groups from 27 countries signed a declaration demanding a stop to the patenting of life forms. They have also been active in challenging the trade-related intellectual property rights established under the World Trade Organization.

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A prime example of women's advocacy efforts is the challenge to the patent of the Neem tree. The Neem tree is used in India for a variety of purposes, including as a contraceptive, a pesticide, a fuel source and an astringent. Its properties and applications have been documented in India for centuries in ancient texts. Women use it in many of their daily activities. India did not patent the Neem tree as it is a product of nature and a common resource.

A US-based company realized that there was money to be made in the Neem tree and patented a method for its extraction.There was an enormous outcry against the patent and hundreds of organizations, including notable women activists and women's organizations, have challenged it in a variety of fora. For many women, the Neem tree patent has become a symbol of resistance.

The Maori women of Aotearoa, New Zealand play a key role in the conservation of their community's natural resources and in preserving their traditional culture in the face of globalization. One example of how they are doing this is in challenging patents by foreign corporations on their resources and traditional knowledge. In the 1980s when the Maori were establishing an ethno-botanical garden, they discovered that traditional strains of a sweet potato that were once grown by the Maori could no longer be found. Upon learning of this project, a research institute in Japan contacted the group to tell them that they had the seed in their possession. Getting no assistance from the government, the Maori women had to travel to Japan to bring back the seed and plant it again.

This incident and concern over the TRIPS (Trade Related Intellectual Property Rights) agreement in the World Trade Organization led to the filing of a claim by Maori women with the Waitangi Tribunal. This tribunal was established through a treaty in 1840 that gave the British settlement rights in exchange for the respect

of the natural rights of the Maori, as original occupants of Aotearoa, New Zealand. Article 2 of this treaty ensures "...the full exercise and undisturbed possession of their lands and estates, forests, fisheries, and other properties which they may collectively or individually possess..." The claim argues a breach of Article 2 of the treaty and is critical of the consultation process and laws regarding intellectual property rights and the expropriation of indigenous knowledge. While a hearing has commenced, a judgement has yet to be reached.

The Maori women feel that the government has failed to take into account traditional ownership rights, which, if protected, would prevent this expropriation. Their loss of tribal ownership over culturally valued flora and fauna has undermined Maori authority and guardianship over natural resources. In light of this, we must find a way to protect intellectural property rights regarding indigenous knowledge while at the same time promoting research and economic development that benefits traditional cultures.

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School children in Cuzco, Peru demonstrate in favor of education.

About Global Alliance

The Global Alliance for Diversifying the Science and Engineering Workforce is a collaborative initiative of the American Association for the Advancement of Science (AAAS); Women in Engineering Programs & Advocates Network (WEPAN); and the Association for Women in Science (AWIS).

The Secretariat is located at AAAS, 1200 New York Avenue in Washington,DC. In the future, the Secretariat will have several international and regional offices.

It has a virtual location with a virtual address and global linkages with higher education, corporations and governments worldwide at *www.globalalliancesmet.org*.

An organization of organizations in partnership to

Goals

In keeping with the recommendations of the 1999 UN World Conference on Science, our mission is to:

- Support efforts to diversify and to develop leadership within the global engineering and science workforce;
- Increase the participation and role of women in policy and decision-making in science, math, engineering, and technology (SMET) worldwide;
- Encourage people from disadvantaged groups within developing and developed countries to pursue research careers in SMET.

Strategic Goals

- Establish worldwide collaborations with higher education institutions, corporations, nongovernmental organizations and governments in order to support efforts to diversify the SMET workforce;
- Facilitate the development of long-term, sustainable infrastructures with a diverse SMET workforce;
- Develop and expand higher education SMET curricula and resources, taking into account gender and cultural diversity;
- Develop common standards for data collection and conducting research on diversity in the SMET workforce;
- Provide short courses in management and development of diversity programs in universities and corporations;
- Build technical human capital in developing nations by providing cooperative education opportunities;
- Showcase women scientists & engineers whose research relates to global science and technology issues;
- Provide research & educational collaborations for the next generation of internationally-oriented leaders;
- Indentify and disseminate the latest best practice information on diversity measures worldwide.

Linking Science and Technology

Poverty	Improve access to technology that develops economic resources for women Highlight the importance of women's traditional technical knowledge and protect women's rights to the wealth derived from that knowledge
Education and Training	Provide access to employment in new technologies Ensure equal access to quality education and training for girls and women that includes basic education in science and technology Build up and maintain support system to encourage access to higher education in scientific and technical fields for women
Health	Provide access to modern, safe healthcare for all women and children Support research that improves quality of life for women and girls Promote corrective and preventive strategies for reducing death and disabilities associated with childbirth
Violence	Support public health research that can pose effective solutions for ending violence against women
Armed Conflict	Use modern technology to determine movement of refugees so that aid can be targeted Utilize technology to provide early warning of conflict.
Economy	Promote entrepreneurship by women using new technologies Utilize economic research to determine market trends that give women access to markets
Decision-making	Promote women's access to decision-making positions influence development choices especially around issue that affect energy, food security, use of natural resources, and education.
Institutional Mechanism	Collect gender disaggregated data to determine differential impact Use gender analysis and indicators in policy formulation
Human Rights	Document abuses against women utilizing modern forensic techniques Disseminate information on new technologies and their role in such documentation to support prosecution of abuses
Media	Disseminate information that can help change the perception of women's roles in relation to science and technology Ensure that women are provided equal access to the Internet and other communication technologies Use the Internet as a tool for education and training
Environment	Support women's roles in the preservation of biodiversity Encourage participation of women in practices and decisionmaking involving sanitation, water use, and land use patterns.
The Girl-Child	Support basic education of girls in science and technology, including access to computers Provide girls with information about their biology to counteract myths of their inferiority

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