

**The Winners of the Blue Planet Prize**

**2011**

**Dr. Jane Lubchenco (USA)**

**Barefoot College (Founded in India)**



# 2011

## Blue Planet Prize

### **Dr. Jane Lubchenco (USA)**

Under Secretary of Commerce for Oceans and Atmosphere

Administrator of the National Oceanic and Atmospheric Administration (NOAA)



### **Barefoot College (Founded in India)**



#### **Wish:**

*The Blue Planet we live in called Earth  
Is full of life  
Filled with prayers of hope  
Woven by life longing for happiness of  
being itself*

*And we ourselves also  
Given life on this Earth  
Intone the melodies of prayer  
Passing them over  
With full of wishes of all the lives  
Bred on this Blue Planet  
Breathed on this Blue Planet  
We ourselves also are fulfilled  
By the prayers of hope  
Of lives longing for happiness of being  
themselves*

*To know that the film this time  
Came to be of help  
For you to listen to the melodies of  
prayer  
Woven, filled with hopes by all the lives  
Bred and breathed on this planet of life  
called Earth  
We are more than delighted*



Selected from the Slide Show Presented at the Opening of the Awards Ceremony



His Imperial Highness Prince Akishino congratulates the laureates



Their Imperial Highnesses Prince and Princess Akishino congratulate the laureates at the Congratulatory Party

The prizewinners receive their trophies from Chairman Tanaka



Dr. Jane Lubchenco



Mr. Bunker Roy,  
Founder of the Barefoot College



Dr. Hiroyuki Yoshikawa,  
Chairman of the Presentation  
Committee makes a toast at  
the Congratulatory Party



Mr. John Victor Roos, Ambassador of the United  
States of America to Japan (left) and Dr. Chadaram  
Sivaji, Counsellor, Embassy of India, congratulate  
the laureates



Dr. Yoshihiro  
Hayashi, Chairman of  
the Selection  
Committee explains  
the rationale for the  
determination of the  
year's winners



The prizewinners meet with the press prior to the awards ceremony

## Profile

# Dr. Jane Lubchenco

Under Secretary of Commerce for Oceans and Atmosphere  
Administrator of the National Oceanic and Atmospheric Administration (NOAA)

### Education and Academic and Professional Activities

1947	Born in USA
1969	B.S. in biology at the Colorado College
1971	M.S. in ecology at the University of Washington
1975	Ph.D. in ecology at Harvard University
1975-1977	Assistant professor at Harvard
1978-1982	Assistant professor at Oregon State University
1978-1984	Research associate, Smithsonian Tropical Research Institute, Panama
1979	Awarded the George Mercer Award from the Ecological Society of America for the best paper on ecology published in 1978
1982-1988	Associate professor of zoology at Oregon State University
1988	Full professor of zoology at Oregon State University
1989-1992	Chairperson of the department of zoology at Oregon State University
1992	President of the Ecological Society of America Pew Scholar in Conservation and the Environment
1993	Elected to the American Academy of Arts and Sciences
1993-1996	A John D. And Catherine C. MacArthur Fellow
1993-2009	Distinguished Professor of Zoology, Oregon State University
1994-95, 1999-2000, 2002-2003	A visiting researcher, University of Canterbury, Christchurch, New Zealand
1995-2009	Wayne and Gladys Valley Professor of Marine Biology, Oregon State University
1996	Elected to the (US) National Academy of Sciences
1996-2006	Member of the National Science Board (Board of Directors for the National Science Foundation); nominated by President Clinton and confirmed by the US Senate
1997	President of the American Association for the Advancement of Science
1998	Elected to the American Philosophical Society
2002-2005	President of the International Council for Science
2002	Elected to the European Academy of Sciences Heinz Award for the Environment, Heinz Family Foundation
2003	Nierenberg Prize for Science in the Public Interest, Scripps Institution of Oceanography Highly Cited Researcher in Ecology/Environment, ISI

2004	Elected Foreign Member of the Royal Society (UK) Elected Associate Member of the Academy of Sciences for the Developing World (TWAS) The Distinguished Scientist Award from the American Institute of Biological Sciences
2005	The Public Understanding of Science and Technology Award from the American Association for the Advancement of Science
2007	Elected Corresponding Member of the Academia Chilena de Ciencias (Chilean Academy of Sciences)
2008	The Zayed International Prize for the Environment, Dubai, United Arab Emirates
2009-present	Under Secretary of Commerce for Oceans and Atmosphere for the National Oceanic and Atmospheric Administration (NOAA)
2010	Peter Benchley Ocean Award for Excellence in Policy, Blue Frontier Newsmaker of the Year, the scientific journal <i>Nature</i>
2011	Public Understanding of Science Award, the <i>Exploratorium</i>

(As of June, 2011)

As a biologist and ecologist, Dr. Jane Lubchenco has contributed a legacy of research that offers profound insight into the way in which marine organisms interact with one another and adapt to their environments. Her outstanding scientific research has demonstrated that human activities have changed the physical structure, chemistry and biology of our planet, and that these changes in turn affect human well-being. She has been a leader in encouraging industries and governments to develop new methods and technologies that will reduce threats to the global environment. Dr. Lubchenco is most widely recognized for her efforts to bridge the gap between scientists and society.

Dr. Lubchenco has left a tremendous impact on the scientific community as well as the general public by showing clearly that while science should be rigorous and objective, scientists must not ignore their responsibility to communicate their knowledge about how the Earth is changing and help develop solutions to minimize adverse impacts. She is an excellent role model, a contemporary environmental scientist of great responsibility, integrity, and commitment.

Dr. Lubchenco was born December 4, 1947, in Denver, Colorado. She entered Colorado College in 1965, where she majored in biology and received her B.S. in 1969. She earned her M.S. in ecology from the University of Washington in 1971 and completed a Ph.D. in ecology at Harvard University in 1975.

Dr. Lubchenco worked as an assistant professor at Harvard from 1975 until 1977. With grants from the National Science Foundation, she conducted research in New England and Panama. She was a visiting professor at the Discovery Bay Marine Laboratory in Jamaica, and a research associate at the Smithsonian Tropical Research Institute in Panama.

In the early 1970s, she married Dr. Bruce Menge, who is also an ecologist. In 1978, Dr. Lubchenco and her husband moved to Corvallis, Oregon, to become Assistant Professors at Oregon State University. They pioneered a novel solution for academic career couples by splitting a single professorship into two half-time, tenure-track positions. This arrangement enabled each of them to teach, do research, and spend significant amounts of time with their children. They have two sons. During this period, she did field research in Panama for six years, which resulted in a number of highly cited papers about the ecology of plant-herbivore interactions, predator-prey interactions, algal ecology and community ecology.

In 1979, Dr. Lubchenco and her husband won the George Mercer Award from the Ecological Society of America for the best paper on ecology published in 1978.

In the 1980s, Dr. Lubchenco became a visiting professor in ecology at the University of Antofagasta in Chile and the Institute of Oceanology in Qingdao, China. From 1982 to 1984, she also served as a council member of the Ecological Society of America. In 1988, she was promoted to full professor of zoology at Oregon State University, where she was chairperson of the department of zoology at Oregon State University from 1989 to 1992. She taught and conducted research at Oregon State University until 2009.

Dr. Lubchenco's highly influential research contributions include topics such as marine ecosystem services, the relationship between biodiversity and ecosystem functioning, causes and consequences of climatic change, the design of marine reserves, aquaculture, dead zones, and the interface between economics and ecology. One of her most important contributions to science is the "Sustainable Biosphere Initiative." This multi-authored report, published in 1991, highlights climate change, biodiversity, and sustainability science as priorities for ecological research because of their relevance to solving global problems.

For her pioneering scientific work and social activities, Dr. Lubchenco has won numerous awards. She was elected president of the Ecological Society of America in 1992 and of the American Association for the Advancement of Science (AAAS) in 1997. In her address as president of AAAS, Dr. Lubchenco introduced the seminal concept of a "social contract" between scientists and society in 1997. She outlined the intimate connections between the environment and human health, the economy, social justice, and national security. According to the "contract," scientists should make a commitment to exert all the power of science to discover new knowledge, to communicate existing and new understanding to the public and policy makers, and to help society transition to a more sustainable biosphere.

Through concepts like the "social contract," Dr. Lubchenco seeks to incorporate sound and clearly stated scientific ecological principles into responsibly enacted public policy. She has shown that the environment is too great an issue for partisanship, because its condition affects us all.

Dr. Jane Lubchenco is now Under Secretary of Commerce for Oceans and Atmosphere and the Administrator of the National Oceanic and Atmospheric Administration (NOAA). She is the first woman and the first marine ecologist to lead NOAA.

NOAA seeks to understand and predict changes in the oceans and atmosphere, to use that knowledge to save lives and property and contribute to the economy, and to be good stewards of oceans and coasts.



## Lecture

# The Beauty, the Bounty, and the Power of Oceans: Achieving a Sustainable Future for our Blue Planet

**Dr. Jane Lubchenco**

### Slide 1※ - Introduction

It is a singular honor to accept the prestigious Blue Planet Prize. I extend my deepest gratitude to the Asahi Glass Foundation, and I applaud the Foundation's recognition of the importance of science-based environmental conservation for our blue planet. I also extend my heartfelt thanks to the people of Japan for their gracious hospitality, and to all of you for coming today.

Our planet is indeed blue:

- The oceans cover 71% of the Earth's surface and contain 97% of the planet's water ;
- They are the likely origin of life on Earth ;
- They support far greater biodiversity – more different kinds of life – than exists on land ; and
- They regulate our weather and climate and provide life support systems for the planet.
- In short, oceans sustain life on earth.

The blue parts of our blue planet have long served as grocery stores, pharmacies, highways, playgrounds, temples and shrines for people on Earth. They inspire us and offer knowledge for those who choose to listen.

However, misled by their vastness and blinded by their murky depths, humanity has taken the beauty, bounty, majesty and mystery of oceans for granted. Thus far, we have failed to safeguard their future—and, therefore, ours. Those who work on and live near the water have witnessed first-hand the changes unfolding in the places they frequent. But make no mistake: the scale of change is global. Overfishing, habitat destruction, pollution, climate change and ocean acidification have taken their toll, disrupting ocean ecosystems and resulting in depleted fisheries, endangered wildlife, tainted seafood, bleached corals, depauperate coral reefs, blooms of jellyfish, harmful algae, and pathogens. The result is increasingly vulnerable coastal communities, economies and societies.

This depletion and disruption affect our economies, our health, the harmony of life, and our future. We are losing the numerous benefits that healthy ocean ecosystems provide such as food security, jobs, vibrant communities and healthy economies, protection from storms, climate regulation, recreational opportunities and cultural icons. Healthy oceans are the life-support system for the planet. Human societies, economies, and health depend on them.

Few people appreciate the seriousness of the problems. Many people see oceans as

※ There are supplement slides *at the back of the section*.



infinitely bountiful. It is hard for them to believe that something so immense could be impacted in severe, and potentially irreversible, ways. Through advances in science, we know that oceans are NOT infinitely bountiful and resilient. They are fragile and vulnerable to human impacts. Those who see the problems may be intimidated by the challenges associated with transitioning to more sustainable practices and policies.

Moreover, far too many people view environmental sustainability as a barrier to economic progress. In reality, having to choose between the economy and the environment is a false dichotomy. Solutions exist to achieve economic growth while maintaining and recovering the life-support services provided by ecosystems. Scientific information has not only helped us understand the problems, it is providing solutions.

Now is a pivotal moment. Global population is 7 billion and growing, with consequent increasing needs for basic goods and services. The environment is changing rapidly and radically. The accelerating pace of environmental change presents serious challenges – and opportunities – for individuals, nations, and the global community to make a transition toward more sustainable practices and policies.

Fortunately, awareness of the challenges facing our oceans is increasing and science-based solutions are readily available. Protecting and restoring healthy oceans is eminently feasible. Success stories abound, but are not at the scale needed. Now is the time to embrace the opportunity to chart a new course for oceans and ourselves.

Today, I focus on proven solutions that emphasize local empowerment, provide opportunities for industry, align conservation and economic incentives, and are grounded in scientific understanding. They enable us to use oceans without using them up. The goal is simple: healthy oceans and healthy people – major ingredients for a healthy blue planet.

## **Slide 2 - My Perspectives**

My focus is influenced by my experiences — as a person, scientist, academic researcher, teacher, and now leader of a federal agency, the National Oceanic and Atmospheric Administration, or NOAA. NOAA's portfolio includes oceans, coasts, weather and climate. Through science, services and stewardship, NOAA saves lives, creates jobs and enables commerce, promotes healthy oceans and coasts and enables informed decision-making. This last role has given me a keen appreciation for the importance of partnerships in dealing with challenges, especially those involving oceans.

Little did I know that a year and a month into my job at NOAA, the U.S. would face an unprecedented environmental disaster in our waters and along our shores — the Deepwater Horizon oil spill in the Gulf of Mexico. Approximately 4.9 million barrels of oil flowed over three months, affecting much of the Gulf itself and over 1,000 miles of shoreline. NOAA's role was to provide scientific guidance, ensure seafood safety, protect habitats and wildlife, assess damage, enable restoration and share information with a wide range of interested parties.

The generosity and assistance provided by our international partners during the Deepwater Horizon disaster was extraordinary. We greatly appreciate the containment boom, oil skimmers, and technical expertise provided by the Government of Japan.

In the aftermath of this year's Tohoku earthquake and tsunami, it was our turn to offer support and kindness to our friends in Japan. NOAA continues to collaborate closely with both Japanese and U.S. Government agencies to assist with response efforts.

Because we had to address similar issues and use similar tools in response to Deepwater Horizon, we shared the lessons we learned and the science we developed during that disaster to support Japan's response efforts. For example, at the invitation of the Japan Agency for Marine-Earth Science and Technology, NOAA participated in a workshop to compare U.S. and Japanese ocean plume models. We are also working closely with Japan on the issue of seafood safety.

Strong partnerships between our countries are critical during times of crisis. Partners communicate and collaborate, they share information and expertise. And these partnerships do not end when the acute phase of a disaster has passed. Rather, partners stand by each other and help each other along the long road to recovery and in determining ways to prevent or minimize future disasters.

Although the vast majority of the oil in the Gulf of Mexico is now gone, and Japan is beginning to recover from the havoc wreaked by the Tohoku earthquake and tsunami, these disasters provide a stark reminder of the interconnectedness of healthy oceans and the communities and economies that depend on them. While the effects of these disasters will be felt for years, we will not rest until the affected communities and ecosystems are made whole again. These disasters also remind us of the importance of addressing other serious problems that emerge more slowly than an acute disaster.

### **Taking Stock of the Challenges: What Do We Actually Know?**

A brief summary of the problems to be addressed sets the stage for considering solutions. Scientific monitoring tells us that deterioration of our coastal and ocean ecosystems is substantial and increasing. I summarize key physical and chemical changes first, then biological and ecological ones. (Social changes are equally important, but I leave those to social scientists.)

#### **Slide 3 - (A) Physical**

Compared to a century ago, oceans are now warmer, higher, stormier, saltier, lower in oxygen and more acidic.

- Global sea surface temperatures have warmed approximately 0.4°C since the 1950s (Levitus et al. 2009) due primarily to the burning of fossil fuels. Sea surface temperatures are projected to increase another 1.8°C to 4.0°C over the twenty-first-century (Solomon et al. 2007). Warmer waters cause coral bleaching, range shifts, altered productivity, and increases in invasive species.
- Increased concentrations of carbon dioxide in the atmosphere (due primarily to burning of fossil fuels) results in increased carbon dioxide in oceans, which causes oceans to be more acidic. Oceans have become approximately 30% more acidic over the past 150 years, and are expected to become more corrosive by the end of this century (Feely et al. 2009). Impacts of this "ocean acidification" will be particularly

severe for calcifying species, including shellfish, corals, and many types of plankton that serve as critical food sources for ocean life.

### **Slide 3 - (B) Biological**

Coastal and oceanic species and habitats have also been significantly altered. Oceans have fewer top predators, more overfished species and more endangered species. There are more harmful algal blooms, more outbreaks of pathogens and pests like jellyfish, more dead zones, more degraded estuaries and coral reefs, and fewer salt marshes and mangroves.

- Fisheries provide food, jobs and opportunities for trade. Although progress is being made in recovering a number of major fisheries (Worm et al. 2009), historic and continuing overfishing on many others puts continued benefits at significant risk. Over 90% of the large, predatory fish biomass in our oceans is gone (Myers & Worm 2003). Thirty-two percent of the world's recognized marine fisheries are overexploited, depleted, or recovering—up from 10% in 1974 (FAO 2010), and these figures do not include the illegal, unregulated and unreported fishing that is suspected of totaling up to 30% of catches in some fisheries.
- All seven sea turtle species are threatened or endangered (Convention on International Trade in Endangered Species of Wild Fauna and Flora), due to a combination of being caught accidentally in fishing gear and destruction of nesting beaches.
- Half of the world's salt marshes, and approximately a third of the world's mangroves and seagrass beds, are already lost or degraded; coral cover has declined by 80% in the Caribbean and 50% in the Pacific (Jackson 2010).
- Increased use of fertilizers, loss of native vegetation along streams and rivers and more concentrated livestock operations have led to increased run-off of nutrients, especially nitrogen and phosphorus. This nutrient pollution causes increases in harmful algal blooms and areas of low-to-no oxygen (so-called 'dead zones'). The number of dead zones around the world has approximately doubled each decade since the 1960s (Diaz & Rosenberg 2008). A recent study identified more than 530 dead zones around the world (WRI 2011).

In short, we have inadvertently altered the chemistry, physical structure and biology of the oceans. The result is a loss of food supply, water purification, pest control, climate regulation and the buffering of coastal areas from storms and tsunamis.

### **Solutions**

Thanks to advances in science, and new partnerships, approaches and policies, creative solutions are emerging to restore the bounty and beauty of oceans. These solutions offer models and hope. I wish to highlight five categories of solutions: (A) ecosystem-based approaches and spatial planning, (B) fisheries management, (C) habitat management and marine reserves, (D) adaptation to climate change and ocean acidification, and (E) greater awareness.

#### **Slide 4 - (A) Ecosystem Approaches and Spatial Planning : A New Conceptual Framework and New Tools.**

1. *Ecosystem Approaches.* Historically, different activities in oceans have been managed on a sector-by-sector or issue-by-issue basis. Often different agencies regulate fisheries, aquaculture, oil and gas production, renewable energy production, water quality, endangered species, marine transportation, marine mammals, and undersea cables, etc., with little regard to interactions with other sectors or issues. In the U.S., there are over 140 different laws and regulations that govern ocean policies and practices at the federal level alone. This hodgepodge approach has contributed significantly to depleted and degraded oceans, frequent conflicts among users, uncertainty or endless red-tape for industry, overlapping jurisdictions as well as gaping holes in responsibility.

Ecosystem approaches provide a more holistic method for minimizing adverse environmental impacts and bringing greater predictability and cohesion. An ecosystem approach considers the individual and collective environmental impacts of different activities, and the importance of maintaining basic ecosystem patterns and processes -- the conditions required to ensure a healthy, productive and resilient ecosystem.

Ecosystem approaches consider people as part of ecosystems and enable an overarching focus on stewardship.

2. *Ecosystem Services.* An ecosystem approach focuses on the importance of maintaining the provision of essential ecosystem services. Ecosystem services are the benefits provided by healthy, resilient ecosystems such as the provision of seafood, nutrient recycling, climate regulation, protection of shores from erosion and storms, control of pests and pathogens and more. Each different coastal or oceanic ecosystem – from an estuary to a coral reef, from a kelp forest to the deep sea, from the tropics to the poles – provides a wealth of services. Ecosystem services are a byproduct of the interactions of plants, animals and microbes in an ecosystem.

Some uses of oceans impair the continued delivery of ecosystem services, others do not.

When an ecosystem is converted from one use to another, some services may be lost, and others gained. For example, when mangroves are converted to shrimp ponds, we obtain the service of food production. However, we lose the natural services provided by those mangroves, such as protection from storms, filtration of pollutants, trapping of sediment, production of wood for boats or firewood, and provision of nursery habitat for juvenile fishes or crabs or adult habitat for birds. Typically, decisions to convert a habitat are made without consideration of the tradeoffs – what is lost and what is gained.

3. *Marine InVEST.* Complementing the ecosystem approach are new scientific analyses to evaluate ecosystem services and trade-offs among different uses. Several tools have emerged recently that help. One promising tool is called Marine InVEST—which stands for Integrated Valuation of Ecosystem Services and Tradeoffs. Developed by the Natural Capital Project of Stanford University, The Nature Conservancy, and World Wildlife Fund, in partnership with NOAA, this tool facilitates scientific understanding and communication of ecosystem services through the modeling, mapping, and valuation of ecosystem services.

Marine InVEST allows users to visualize the tradeoffs among environmental, economic, and social benefits that result from various decisions or management strategies. InVEST offers a new approach for incorporating scientific information about ecosystem services into decision-making, spatial planning, and resource management. This tool is particularly effective in the context of coastal and marine spatial planning.

Successful ecosystem approaches focus on maintaining the resilience of the ecosystem, not simply on production of one or more services such as production of food. Innovative efforts are underway to identify indicators of ecosystem health to assist these novel ways of thinking about policy and management.

Increasing demands on ocean space for diverse uses, including tourism, recreation, fishing, shipping, national security, oil and gas exploration, and wave and wind energy, have led to more and more conflicts among users—as well as additional impacts on ocean ecosystems already stressed by climate change and more. Spatial planning is another new tool designed to minimize both conflicts among uses and environmental impacts. Spatial planning considers the full range of possible activities in an area then identifies the combinations of uses that achieve the dual goals. Spatial planning enables integrated, forward-looking decision making. Enhanced certainty and predictability for industry, improved stewardship and sustainable use provide compelling reasons for this more comprehensive approach.

Spatial planning has been practiced on land for centuries but is a relatively new concept for oceans. The first large-scale comprehensive CMSP effort was developed in the 1980s for the Great Barrier Reef Marine Park in Australia. Under the Great Barrier Reef plan, specific areas are designated for different uses, including fishing and tourism, and other areas are designated as fully protected, helping to minimize user conflicts and ecosystem impacts.

Successful implementation of spatial planning depends on accessible scientific information, user-friendly tools and a social process for setting goals and choosing options. Marine InVEST, described earlier, is helping coastal communities understand the trade-offs among ecosystem services that flow from different management decisions. One example comes from Vancouver Island, British Columbia, where communities were considering options for siting a wave energy facility. The communities wanted to evaluate three different locations for the facility to determine which site would maximize energy yield while minimizing impacts to existing activities of importance, specifically fishing.

Using data on wave potential along the coastline, Marine InVEST modeled how much energy generation was possible at each site, calculated the value of that power in dollars, then prepared maps showing the major commercial and recreational fishing areas to determine which site would have the least impact on fishing. The combined findings indicated a specific site that would achieve the dual goals of maximizing energy potential and minimizing impacts to fisheries. Tools such as Marine InVEST are helpful for visualizing scenarios and minimizing user conflicts in spatial planning.

4. *Governance policies enabling ecosystem approaches.* A number of nations and states have recently adopted policies that codify ecosystem approaches and spatial planning into their governance framework. Last year, President Obama signed an Executive Order creating the first-ever U.S. National Ocean Policy that outlines a bold vision for more holistic,

ecosystem-based and science-based management of U.S. waters – management that more accurately reflects the scientific understanding of the multiple and interacting impacts of humans on coastal and ocean ecosystems. The Policy reflects the interconnected nature of humans and oceans – and underscores the fact that our communities, economies, and livelihoods depend on healthy ecosystems.

A cornerstone of the National Ocean Policy is the notion of partnerships at multiple scales. Interagency coordination for ocean management across 24 different federal departments and offices has already improved significantly. Spatial planning will be done by regional planning bodies with membership from local, state, tribal, and regional levels. A number of states in the U.S. have embraced the concepts of marine spatial planning and ecosystem-based management and are in various stages of implementing their efforts.

#### **Slide 4 - (B) Fisheries**

Seafood is a critical ecosystem service provided by oceans. For billions of people, seafood means food security. For others and for many coastal communities, fishing is the culture, a way of life, and the tradition. For many communities and nations, it is a source of revenue, a commodity to export or trade. But serial overfishing of one stock after another, aided immeasurably by technological innovation, has rapidly depleted oceans around the globe. And certain types of fishing gear have destroyed bottom habitats and devastated many non-target species such as sea turtles, sea birds, and marine mammals. These impacts often cascade through an entire ecosystem, contributing to further depletion and disruption. Even in ‘well managed’ fisheries, overfishing occurs all too often. But recognition of these challenges has stimulated scientific innovations that are revolutionizing fishery management.

Traditional approaches to fishery management often result in a ‘race to fish’ in which each fisherman, boat or nation catches as much as possible, as quickly as possible, until the entire quota for the year has been landed. In an effort to prevent overfishing in this intense race, fishery managers use traditional tools that restrain fishing effort: specific seasons or number of days that can be fished, types of gear to be used, etc. This in turn often results in enhancement of capacity, with larger, faster boats and improved technology to find fish faster. In extreme cases, the race to fish is so intense that the entire year’s allocation for a fishery may be caught in a single day. The overall result is often unintended, but nevertheless real, overfishing, significant ‘by-catch’ of non-target species, unsafe fishing conditions, poor quality of seafood, low market prices when the market is glutted with a particular species followed by dry periods when none of that species is available.

Clearly, not all fisheries are the same and some nations have been more successful at managing fisheries. In the United States, a law called the ‘Magnuson Stevens Fishery Conservation and Management Act,’ amended in 2006, is widely hailed as landmark legislation that mandated strict adherence to scientifically determined annual limits on each fishery to end overfishing and firm measures to rebuild depleted fisheries. That legislation requires my agency, NOAA, to have in place by the end of 2011 specific limits on and rebuilding plans for each of the 528 federally managed stocks and stock complexes in US waters. We are on track to do just that. And many previously overfished species are recovering. Since 2000, 21



previously overfished stocks have been rebuilt. NOAA estimates that rebuilding all depleted stocks in US waters could add 500,000 jobs and \$32B to the US GNP. Few nations have such strict rules, and they were put in place following decades of overfishing. Moreover, actually implementing these annual catch limits continues to be challenging.

Overall, the economics of traditionally managed fishing favors intense exploitation, overfishing, and negative impacts to other species. Exploitation too often trumps conservation. A focus on short-term economic gain too often trumps economic prosperity over the long term.

A very different approach to managing fisheries, called ‘catch shares,’ has been adopted in a number of developing and developed countries. One example of a catch share program that is used in the United States, Iceland, Chile, Australia, Canada, and New Zealand is the ‘individual transferable quota.’ This alternative approach eliminates the classical race to fish that plagues traditionally managed fisheries by allocating a fraction (a ‘share’) of the total allowable fishery catch to individuals, communities, cooperatives, or other entities. The right to that fraction, let’s say ‘one percent of the total,’ persists from year to year. Think of the overall fishery as a pie. A share holder’s fraction (in our example, 1%) stays the same regardless of the size of the pie each year. In this system, each shareholder has a vested interest in seeing the fishery be healthy so the amount of fish they are allocated can grow through time. As the health of the fishery increases and the total catch increases (the size of the pie increases), so too does the amount allocated to each share-holder. In this system, conservation and economic incentives are aligned, in contrast to traditionally managed fisheries in which they are in conflict. Catch shares enable a focus on long-term economic prosperity and ecosystem health, not just short-term economic gain.

Another type of “catch share”—one that has been used for centuries in Japan—provides an individual fisherman or group of fishermen with the exclusive right to fish in a given geographic area. Today, we call these types of spatial rights “territorial use rights in fisheries,” or TURFs. TURFs provide fishermen with the incentive to harvest sustainably and to keep the habitat within their exclusive fishing zone healthy and resilient. Again, conservation and economic incentives are aligned.

A scientific analysis of the performance of catch share fisheries vs traditionally managed fisheries found that the former are much more likely to result in sustainable fisheries. Catch share programs are not a panacea, nor are they appropriate for all fisheries, but they are proving to be a powerful new tool to end overfishing. Based on the scientific evidence, NOAA is encouraging its fishery management councils to consider catch shares wherever they are appropriate for a particular fishery. NOAA now has a formal policy supporting the use of “catch shares” in appropriate fisheries in the United States.

Efforts are underway to explore ways to use catch share concepts in international fisheries.

#### **Slide 4 - (C) Habitat Management and Marine Reserves**

Ecosystem approaches have drawn attention to the importance of protecting habitat and biodiversity to achieving healthy ocean ecosystems and resilient fisheries. New scientific information about the multiple benefits of marine protected areas (MPAs), and especially no-



take marine reserves, illustrates just how useful these underutilized tools are to protect and restore ocean ecosystems and achieve sustainable fisheries. An MPA is any area of the ocean that is managed for some conservation purpose. MPAs vary widely from one to another, e.g., allowing all activities except one, or allowing few. No-take marine reserves are areas of the ocean that are protected from any extractive or destructive activities. They prohibit fishing, mining, drilling for gas or oil or dumping, but allow non-extractive activities such as swimming, boating, scuba diving, etc.

Although there are thousands of MPAs around the world, and far fewer marine reserves, most are tiny. Globally, less than one percent of oceans is protected in MPAs and far less than that in no-take marine reserves. (In contrast, between 10 and 15% of the land area is protected in parks.)

Recent scientific analyses of MPAs, but especially of marine reserves, provides powerful evidence that these tools have much to contribute to recovering depleted fisheries and promoting healthy and resilient ocean ecosystems. Around the world marine reserves consistently result in recovery inside the reserve of depleted species, including significant increases in biomass, density and diversity of many species. Much of this bounty also spills outside to the surrounding area. As important as this 'spill over' effect may be locally, the biggest potential benefit lies in the increase in size and thus reproductive potential of individuals within reserves. Larger fish and invertebrates produce many more offspring than smaller bodied individuals. Reserves allow fish and invertebrates to get large. This large size translates into immense reproductive potential. The larvae or young are often transported outside the reserve to varying distances and serve to replenish fished areas. Marine reserves are clearly a powerful but underappreciated tool for which scientific evidence is compelling.

Marine reserves are increasingly seen as good options to combine with other tools such as TURFs or to promote ecosystem resilience in the face of environmental change. Some countries are experimenting with combining marine reserves with TURFs. Fishermen with exclusive access to areas adjacent to a marine reserve reap the benefit of spill over from the reserve. Moreover, reserves may provide significant benefit in protecting biodiversity and contributing to greater ecosystem resilience in the face of climate change and ocean acidification.

#### **Slide 4 - (D) Climate Change and Ocean Acidification**

As described previously, climate change and ocean acidification pose some of the greatest threats to ocean ecosystems and the valuable services they provide. The ultimate solution to both is a significant reduction in production of carbon dioxide.

Because non-climatic stressors, such as pollution, overfishing and non-native species can interact with and exacerbate the effects of climate-related stressors on ecosystem services, strategies to reduce pollution, overfishing and invasive species are a sound approach to help ameliorate some of the impacts of climate change and ocean acidification in the short term. In similar fashion, protecting as much biodiversity as possible (for example, in marine reserves) can enhance ecosystem resilience to climate change and ocean acidification.

The tools described above are complementary to one another. A recent study in *Science*

offers some solutions for using local actions to buffer coastlines from the impacts of ocean acidification. Land-based freshwater runoff can contain fertilizers and other pollutants that acidify oceans at the local scale. By implementing policies to reduce coastal erosion and runoff and foster sustainable land use, we can decrease the impacts of non-climatic acidification and enhance resilience to climate-related acidification.

Working at the local level can also help sustain ecosystem services in another way: by informing people about how activities in their own backyards affect ocean health.

#### **Slide 4 - (E) Greater Awareness**

As described above, powerful new, scientifically based solutions are available to address many of the significant problems facing oceans. Ecosystem approaches, spatial planning, tools to understand and evaluate tradeoffs in ecosystem services, new governance policies, catch shares, and marine reserves all offer significant hope for restoring depleted and disrupted ocean ecosystems and providing long-term benefit to people. However, these tools will not be utilized unless there is greater awareness they are needed and greater public and political will to effect change.

While public understanding of ocean issues has grown, it has not grown quickly enough. Fortunately, new communication tools and champions are emerging. Social media, powerful visualization and sharing platforms such as Google Ocean, and fresh voices offer timely opportunities to raise awareness and share information. Scientists have a key role to play in making their knowledge more accessible, relevant and understandable, embracing new communication tools and nontraditional partnerships, and devising creative solutions to local to global problems.

Moreover, scientists can take heart from the knowledge that despite the immensity of the challenges, meaningful change may be closer than it often seems. Social change is highly non-linear, often characterized by rapid shifts, or “tipping points.” Seemingly small changes can trigger abrupt change. Witness the fall of the Berlin Wall, collapse of the Soviet Union or the recent regime shifts in the Middle East. Witness abrupt changes in social attitudes, e.g., toward women’s rights or smoking.

The plethora of efforts around the world – through communities, universities, faith-based groups, businesses, non-governmental organizations, governmental agencies, and concerned citizens – are building. The question is: what will it take to trigger more rapid positive change?

Inspiring actions are occurring at local to global scales:

- As consumers make more informed choices;
- As policies and management more accurately reflect our scientific understanding;
- As industries develop commitments to source only sustainably caught or farmed seafood;
- As creative endeavors seek to align economic and conservation benefits.

It is my hope that the Blue Planet Prize can help catalyze more rapid change toward a more sustainable path. Scientists, public servants, citizens, activists, consumers, and

environmental stewards all have key roles to play.

### Slide 5 - Conclusion

To my hosts in Japan today, I offer heartfelt thanks and a few closing thoughts. As coastal nations, Japan and the United States share a deep and abiding respect for the beauty, the bounty, and the fury of the oceans. We understand the interdependence between healthy oceans and healthy coastal communities, and we appreciate the need to restore harmony to our oceans and coasts. We recognize the importance of balance, and we understand the need to work with nature to ensure that this balance is maintained.

As a public servant, I have worked to implement solutions, raise awareness, and provide people with information to make smart decisions – all grounded in science. As a grandmother, I passionately want to leave a healthy blue planet for my baby granddaughter.

Restoring the health and bounty of the oceans is one of the greatest challenges of our lifetime. It is up to us to shape a sustainable future. The scientific knowledge and tools I've highlighted point the way.

I am reminded of the eloquent words of Dr. Martin Luther King, Jr., who inspired a societal tipping point for civil rights in the United States and around the world. When writing about this great challenge, Dr. King spoke of 'the fierce urgency of now'. In his book, *"Where Do We Go From Here, Chaos or Community,"* Dr. King said:

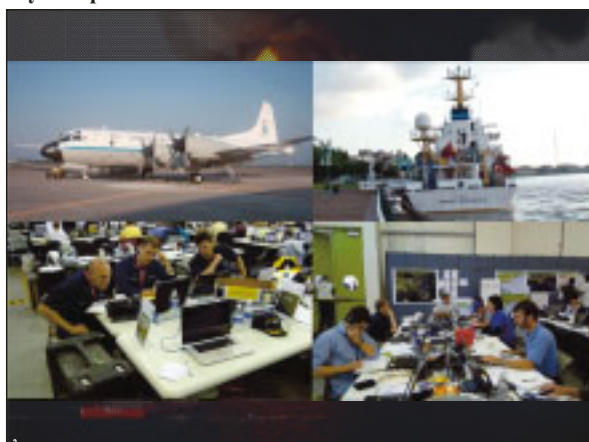
- "We are now faced with the fact that tomorrow is today. We are confronted with *the fierce urgency of now*. In this unfolding conundrum of life and history there is such a thing as being too late. . . . The 'tide in the affairs of humanity' does not remain at the flood; it ebbs.
- We may cry out desperately for time to pause in her passage, but time is deaf to every plea and rushes on. Over the bleached bones and jumbled residues of numerous civilizations are written the pathetic words: 'Too late.'
- We still have a choice today... This may be humankind's last chance to choose...."

If we delay, we risk being "too late." Healthy, productive, resilient oceans are possible with collective and concerted effort. Only by working together as a global community, with a sense of purpose, urgency, and hope, can we achieve the goal of a more sustainable future for our blue planet. I sense the 'fierce urgency of now.' Do you?

**Slide 1**  
**Introduction**



**Slide 2**  
**My Perspectives 1**

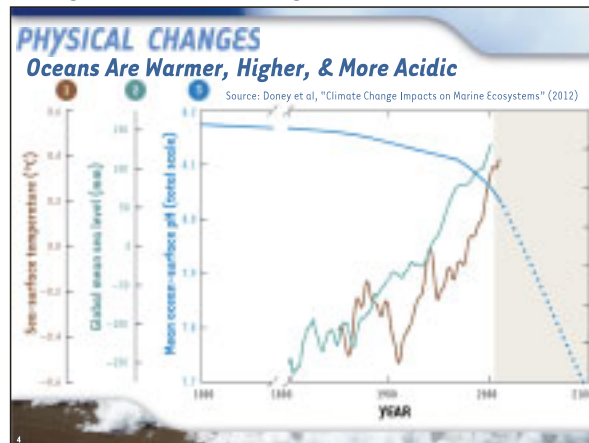


**Slide 2**  
**My Perspectives 2**



### Slide 3-A

#### Taking Stock of the Challenges 1



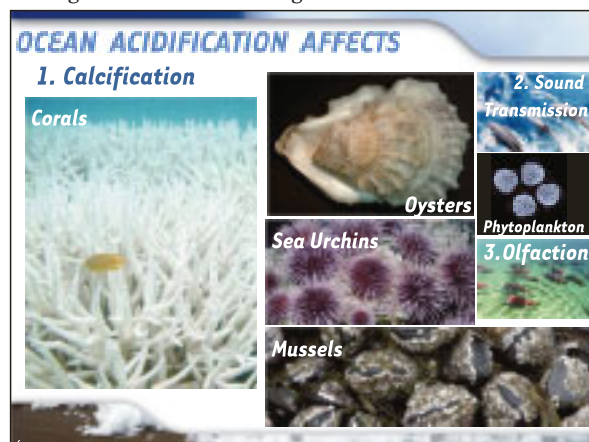
### Slide 3-A

#### Taking Stock of the Challenges 2



### Slide 3-A

#### Taking Stock of the Challenges 3



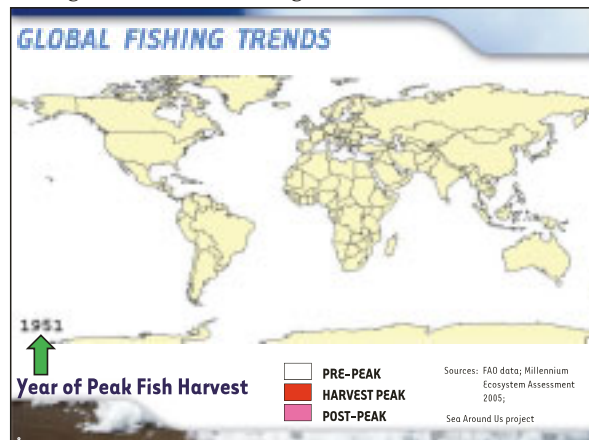
### Slide 3-B

#### Taking Stock of the Challenges 1



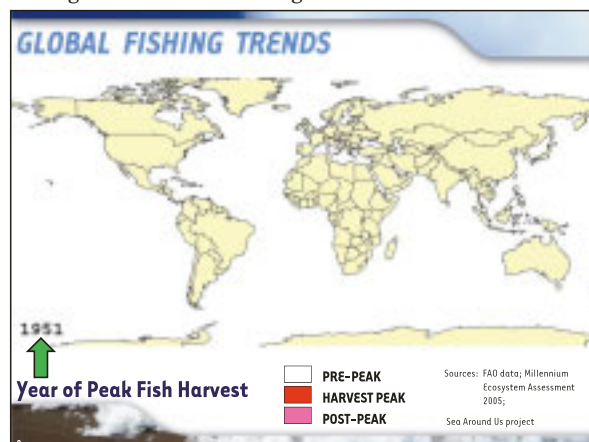
### Slide 3-B

#### Taking Stock of the Challenges 2



### Slide 3-B

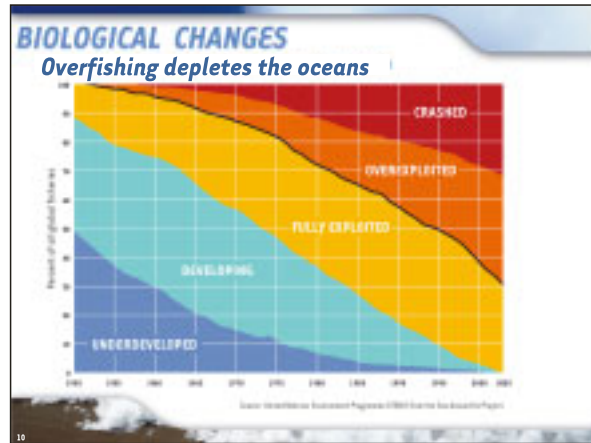
#### Taking Stock of the Challenges 3





### Slide 3-B

#### Taking Stock of the Challenges 4



### Slide 3-B

#### Taking Stock of the Challenges 5



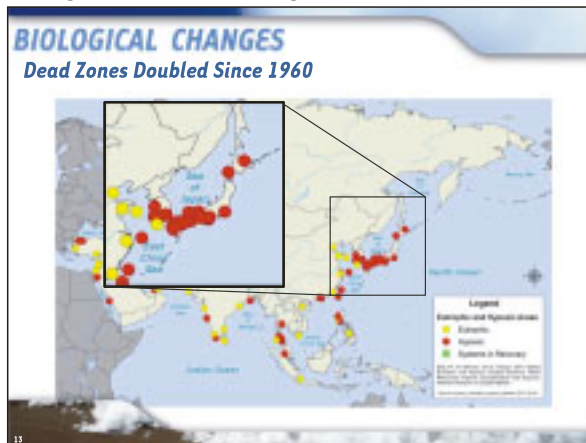
### Slide 3-B

#### Taking Stock of the Challenges 6





**Slide 3-B**  
Taking Stock of the Challenges 7



**Slide 4-A**  
Solution 1



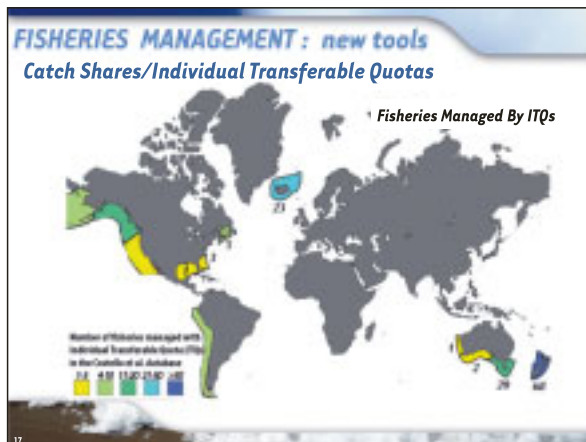
**Slide 4-A**  
Solution 2



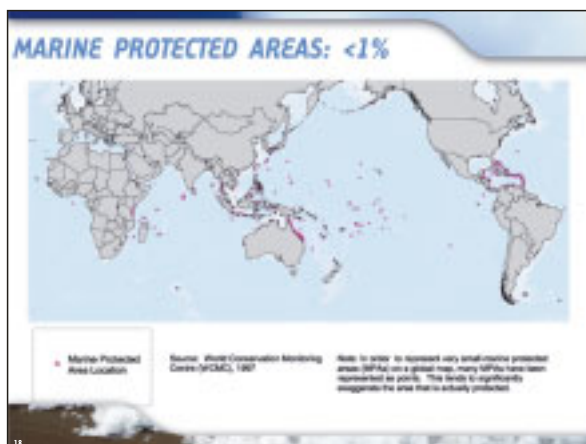
Slide 4-A  
Solution 3



Slide 4-B  
Solution

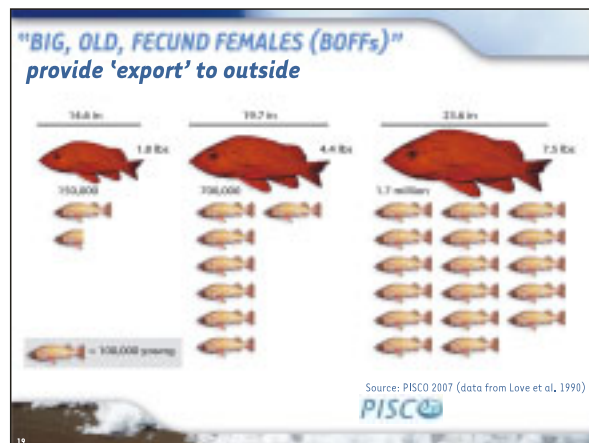


Slide 4-C  
Solution 1



## Slide 4-C

### Solution 2



## Slide 4-D

### Solution 1



## Slide 4-D

### Solution 2



## Slide 4-E

### Solution



## Slide 5

### Conclusion



## Profile

# Barefoot College

Established in 1972, the Barefoot College has a long history providing basic services and solutions to problems in rural communities. The ultimate objective of the college is to help these communities achieve self-sufficiency and sustainability. These ‘Barefoot Solutions’ can be broad, encompassing solar energy, water, education, health care, rural handicrafts, people’s action, communication, women’s empowerment, and wasteland development. All Barefoot initiatives are planned and implemented by a network of rural men and women. Because the College believes that it must be based in the village as well as managed and owned by those whom it serves. Those who teach and help rural communities are known as ‘Barefoot Professionals’, and they defy social stereotypes as to the ability of rural communities and people. It is noteworthy that these Barefoot Professionals have been exemplifying an environmentally sustainable and energy-efficient life realized not only in India but in other developing countries. The most precious and irreplaceable achievement of the Barefoot College is that it enables people to help themselves and live with dignity and self respect.

### History and Values of the College

In the late 1960s, a very small group of individuals in India sought an alternative ways of living, thinking about, and looking for rural solutions. After a long and difficult period of trial and error, the group began a process of re-learning life in remote villages with the villagers themselves.

By the early 1970s, urban educated persons and professionals started their own search for working models. However, they were not all successful. While some individuals chose to live in villages, others thought it better to base themselves in the big towns and cities of India. At that time, the idea of living and work in villages was considered ‘crazy and daring’. Even with considerable opposition from their parents, they chose an alternative way of life.

Founder Bunker Roy was one person who came to rural community and chose to live there. In 1972, he and other educated people were given permission to collectively register as the Social Work and Research Centre (SWRC), today known as “Barefoot College”. The name emphasises the organisation’s commitment to poor, neglected, and marginalized sections of society.

In 1972, forty-five acres of Government land and an abandoned Tuberculosis Sanatorium (consisting of 21 buildings) was leased from the Government at Re.1 a month, to serve as a campus. The Barefoot College started working in the village of Tilonia in Rajasthan, with a population of about 2,000 people.

When it was founded, most people working at the College were geologists, economists, doctors, medical and social workers, chartered accountants, graduates and post graduates from universities, who were determined to serve in the villages. Local participation was limited to men, as the College was misunderstood as a missionary organization seeking

conversions.

Members of the College focused on trying to identify the needs and priorities of village communities to improve their standard of living and quality of life. The idea was to upgrade their existing traditional skills and knowledge through training, and to help them take control over basic services at the grassroots level. The College struggled and campaigned for justice and the fair application of law, as well as to bring transparency and public accountability to rural communities in whose name the funds were received.

### **Rise of the Barefoot College**

The early 1980s saw a substantial change in the nature of the College work force, with locals forming 80% of the organization. Local people were gradually were taking charge of the activities and initiatives right from planning to completion, reducing on the need external aid and learning to self sufficient.

The Barefoot College aimed to adopt a new approach to and understanding of social work and community development, by using the local skills to achieve sustainable people-centric and participatory development. The importance of respect the wisdom of traditional knowledge was fully understood and moulds it with the involvement of rural communities to meet their needs. It identified and worked with only poor and marginalised farmers, landless peasants, rural artisans, women, children, and scheduled castes and tribes as its target groups.

### **Barefoot Campus**

In 1977, the College acquired eight acres of land for its new campus in Tilonia. The campus was constructed between 1980 and 1986, and was designed by a team of rural Barefoot architects, masons, blacksmiths, farmers, and members of women groups, who all worked together through the difficult basic design of the campus.

One example of the eco-friendly construction of the campus is that all rooftops were designed to connect one underground water tank with the capacity to collect 400,000 litres of rain water. This tank was constructed under an amphitheatre to utilise the space more efficiently. Overflow from the tank was designed to be directed to open wells.

### **Basic Values**

The Barefoot College has been providing simple solutions to rural problems based on five non-negotiable values: equality, collective decision-making, self-reliance, decentralization, and austerity. For example, the salary structure of the organization is set according to basic values, irrespective of caste and class barriers. People eat in the same mess and wash their own plates. The Barefoot College has also been very flexible in learning from its own mistakes and adapting to changing times.

Although most of the people involved with the Barefoot College are living on less than \$1 a day, the College trains them to be self-sufficient, which enables them to live with dignity and self respect. This appears to be the secret and source of the success of the College, with its impressive history. The most powerful technique that the College has been using is the 'learn and relearn' method that enables people to adopt new ideas flexibly without being afraid of making mistakes. Thus the organization has laid a solid foundation for itself.



## Essay

# Grass Root Sustainable Solutions Where the Rural Poor Come First

**Mr. Bunker Roy**  
**Barefoot College**

Empowering the rural poor means developing their technical, human and financial capacity to be independent. It means developing their skills so they become competent decision-makers with the confidence to act on their choices. The approach that big donors and Western-conditioned experts have taken to reach the poor—forget about allowing the poor to develop themselves—has been patronizing, top-down, insensitive, and expensive. It excludes the marginalized, the exploited, and the very poor and keeps them from making decisions on their own. This has left them dependent and hopelessly ill prepared to improve their lives. Sadly, these “patrons,” however well intentioned, have refused to learn from their mistakes. In the name of tackling the serious problems of sustainable development they are stuck in a rut that wastes money on a process that simply has not worked.

Enough research has been done. There is strong evidence to show the poor are becoming poorer around the world. This is because alien urban solutions are being imposed on solving basically rural problems. Fundamental change only comes out of conflict of ideas, approaches and methods. There are indeed many other ways of empowering the rural poor.

It starts with giving the poor the right to decide for themselves how they want to improve their quality of life. They must have the right to choose whether they want the urban experts to come into their villages with “modern” ideas. They must have access to information and knowledge and the right to decide whether they would like to be independent of advice and skills from outside when they already have such incredible technical, human, and even financial resources within their own communities. They can even decide whether some knowledge would be useful if they could adapt it to serve their needs. What they need is the opportunity and space to develop themselves.

When provided with that mental and physical space, the poor can achieve wonders without any outside professional interference or advice. The trouble is that, even though established approaches have failed to achieve sustainable improvements, people are reluctant to turn the top-down process on its head and start from the bottom up. Few operational models provide a contrast that demonstrates the alternatives. But outside the usual box are other more cost effective approaches that draw more on the practical experience of the grassroots. There are ways to build on local knowledge and skills. And these approaches can be replicated on a large scale.

Observe the remote inaccessible villages around the world. There is no one left but the very old, the women, and the very young. The youth have left. The youth have left to look for



jobs—any job that would take them away from the village—because the predominant value system denigrates rural life, skills, and traditions and offers little hope of improving the quality of life. They have certificates in their hands from uninspiring mediocre technical institutes and colleges located in small towns producing “graduates” by the thousands with high expectations. These youths thought with a paper degree in their hands they were going to get well-paid, secure jobs in the cities. Instead, they swelled the ranks of the educated unemployables living on the pavements and in the slums in the metropolitan cities of India.

When the youth fled, they took with them the dying hopes of their parents—weavers, blacksmiths, potters, builders, carpenters, farmers—to pass on the traditional skills to the next generation. They left behind not only their families but also the knowledge their elders had collected over the generations to adapt to local conditions, apply low cost sustainable solutions and provide a “living” example of how to live simply. Remember what Gandhi said, “Live simply so that others may simply live.” This is knowledge that no formal educational system values, but it is critical for developing a community with dignity and self-respect. The formal educational system as we know it makes them look down on their own roots.

What we have “unlearned” is our gross underestimation of people’s infinite capacity to identify and solve their own problems with their own creativity and skills, and to depend on each other in implementing solutions. The empowerment of the marginalized rural poor is about developing that capacity to solve problems, to make choices, and to have the collective confidence to act on them.

These people need to assert their identity and demonstrate that their knowledge and skills are not outdated, second-rate, or irrelevant. They need a college dedicated to their specific and special circumstances, and one that is located in a remote rural area. They need a place where they could feel a sense of ownership, where their self-respect and self-esteem could be developed gradually over the years.

So is it not time to start thinking of a College only for the poor? Where the teacher is the learner and the learner is the teacher. A place which is managed, controlled and owned by the poor who earn less than \$ 1/day: where paper degrees and diplomas are a disqualification and people are judged not according to their degree of literacy or academic distinction, but by their attributes: honesty, integrity, compassion, practical skills, creativity, adaptability, willingness to listen and learn, and ability to work with all sorts of people without discrimination. The goal is not to change their lifestyle but to gain the basic skills they need to provide to their own communities a vital service, one that urban professionals are currently trying to provide, often unsuccessfully.

If we are to show how to live simply in a sustainable manner what we need is a radical departure from the traditional concept of a “college” because it encourages a hands-on learning-by-doing process of gaining practical knowledge and skills rather than written tests and paper-based qualifications. It promotes and strengthens the kind of informal education one absorbs from family, community, and personal experience. It deliberately confers no degrees, with a view to reversing migration. If one can improve the quality of life in one’s community by providing a vital service, why would anyone in their right mind want to live an unspeakably miserable existence in the urban slums?

First, we need to demystify education, taking Mark Twain to heart: “Never let School interfere with your Education.” Mahatma Gandhi believed that giving more importance, value, and relevance to practical skills and applying traditional knowledge to solving day-to-day problems was essential for living a sustainable life style.

Second, give priority to the ideas, thoughts, and wishes of the rural poor. It values keeping the oral tradition alive from father to son. The focus should be to make the young men, women, and children living in the village aware of this precious resource so that eventually they will stay in their villages and not migrate to the cities to end up living in a slum.

There is a desperate need for a place where no importance is placed on urban experts with paper degrees and qualifications who want to participate in it. Sadly, thirty years of exposure and experience in rural India has shown that most people with high-level paper qualifications are unfit (and misfits) when it comes to living and working in remote rural areas. They do not have the patience, humility, listening skills, open minds, tolerance, or capacity to show respect for traditional knowledge and skills.

Third, enhance the self-confidence and competence of the poorest of the poor by providing them access to learning that develops their ability to serve their own community, thus making them more confidently self-reliant. The criteria for selection is simple. Select only those village people—both men and women—who are illiterate, semiliterate, or barely literate and who have no hope of getting the lowest government job. Train them as educators, doctors, teachers, engineers, architects, designers, communicators, hand pump mechanics, and accountants. Let them demonstrate that “experts” from the urban areas with paper qualifications are not really required to make villages self-sufficient and sustainable because they can do the work themselves.

### **Empowering Rural Women**

The secret is to recognize the potential of illiterate and semi-literate women to succeed in those areas reserved traditionally reserved only for men. They have shown an awesome capacity and confidence to provide a service to their communities and to destroy stereotyped images and roles in the process.

Today many women in non-traditional roles are serving their own communities. Women are working as night school teachers, hand-pump mechanics, solar engineers, water engineers, architects, masons, and fabricators of solar cookers. Illiteracy has never been considered a barrier to women developing themselves as professionals. Illiterate women have shown they are capable of handling computers and training unemployed youth in feeding technical, health, and literacy data.

What is remarkable is that for the first time sophisticated solar technology has been demystified, and simple village women have demonstrated how effectively they can manage and control it to improve their quality of life. They now have the opportunity to develop their competence and confidence to handle technology, providing services to their own community that gives them a new level of acceptance and the respect they deserve.

## **Challenges and Lessons Learned**

What is needed is a pioneering and innovative approach to applying the knowledge, skills, and practical wisdom of the rural poor—which may be the only way to make communities self-reliant and sustainable.

With roots in the village community and a deep-rooted respect for the proper and wise use of water, air, earth, and the sun, the rural poor have set an example of how NOT to waste or overexploit nature resources. They are a living testimony to Mahatma Gandhi's famous saying, "The world has enough for every man's need but not for one man's greed."

The approach could have a considerable impact in changing the mindset of urban "experts" and influencing their attitudes toward the idea of having the poor identify and solve their own problems. Development with dignity means development with less dependence on urban skills and more self-respect.

## **Major Challenges**

### **1. Promoting a Different Vision of Sustainable Development**

The first challenge has been to convince people that a different vision of sustainable development is possible. The most formidable of hurdles has been to convince urban people that semi-literate rural women from any village in India—indeed, any remote village in the world—can competently provide basic professional services to their own communities. This task continues to be a daunting one since it involves changing long-held stereotypes, mindsets, and attitudes towards the poor.

### **2. Dealing with Success**

The second challenge has been dealing with success. Once it has been demonstrated that any semi-literate rural woman can solar-electrify remote villages and look after solar units more competently than paper-qualified solar engineers this is likely to turn established perceptions upside down, and debunk the basic assumption that formal education is required for sustainable development work.

The very idea of semi-literate women being able to manage and control initiatives at the village level is almost inconceivable.

### **3. Learning from Failure**

The third major challenge is to learn from successful failures. Taking risks, trying new ideas, failing and trying again is a process that should be respected. We recognize that we should learn as much from failure as from success. But the formal education system has no room for failure. In that system, failure is considered a matter for shame and regret. We should give everyone involved the opportunity to make mistakes and learn from them.

What is long overdue is to put into practice an idea first espoused by Mahatma Gandhi: that the resources required to develop poor communities lie within the bounds of those communities. Human, technical, and financial resources need not come from outside in order for a community to bring about fundamental change and improve its quality of life. Too often, community resources are neglected, looked down upon, and considered inferior just because

they have not conformed to the formal requirements of the education system.

What needs to be shown on the ground is that villagers themselves with little or no educational qualifications, can learn to provide basic services to their own community. To be able to change the mindset of poor rural people who have been made to feel that they cannot do it themselves is an enormous contribution. Less developed countries would benefit immensely from realizing this inner strength all poor communities have. It can eventually transform the outlook not only of development officials, but, most importantly, of the rural poor themselves

First they ignore you, then they laugh at you, then they fight you, and then you win—*Mahatma Gandhi*

## Lecture

# Demystifying Professionalism: The Barefoot Approach

**Mr. Bunker Roy**  
**Founder, Barefoot College**

Empowering the rural poor means developing their capacity. It means developing their skills so they become competent decision-makers with the confidence to act on their choices. Thus far, conventional approaches to such empowerment have failed. The approach that big donors and Western-conditioned experts have taken to reach the poor—forget about allowing the poor to develop themselves—has been patronizing, top-down, insensitive, and expensive. It excludes the marginalized, the exploited, and the very poor and keeps them from making decisions on their own. Thus it disempowers them, leaving them dependent and hopelessly ill prepared to improve their lives. Moreover, these “patrons,” however well intentioned, have refused to learn from their mistakes. They are stuck in a rut that wastes money on a process that simply has not worked.

Enough research has been done. There is strong evidence to show the poor are becoming poorer around the world because we have been tackling rural problems by thrusting urban solutions on the poor. That is not what they need. On the basis of overpowering documentation what is the need of the hour is implementation. Fundamental change only comes out of conflict of ideas, approaches and methods. There are indeed many ways of empowering the poor. The “barefoot approach” is one such way.

It starts with giving the poor the right to decide for themselves how they want to improve their quality of life. They must have the right to choose whether they want the urban experts to come into their villages with “modern” ideas. They must have access to information and knowledge and the right to decide whether they would like to be independent of advice and skills from outside when they already have such incredible technical, human, and even financial resources within their own communities. They can even decide whether some knowledge would be useful if they could adapt it to serve their needs. What they need is the opportunity and space to develop themselves.

When provided with that mental and physical space, the poor can achieve wonders without any outside professional interference or advice. The trouble is that, even though established approaches have failed to achieve sustainable improvements, people are reluctant to turn the top-down process on its head and start from the bottom up. Few operational models provide a contrast that demonstrates the alternatives. But outside the usual box are other more cost effective approaches that draw more on the grassroots. There are ways to build on local knowledge and skills. And these approaches can be replicated on a large scale.

## **Origins of the Barefoot Idea**

In 1971, I went to live and work in the rural village of Tilonia in Rajasthan, India, after receiving the most elitist, expensive, snobbish private education that any Indian could possibly receive. When I arrived, I remember being shaken by the questions the elders asked me:

Are you running from the police? Did you fail in your examinations? You did not manage to get a government job? Is there something wrong with you? Why are you here? Why have you come from the city to this village? There is no one here but the very old, the women, and the very young. The youth have left.

The youth had left to look for jobs—any job that would take them away from the village—because the predominant value system denigrated rural life, skills, and traditions and offered little hope of improved incomes or quality of life. They had certificates in their hands from uninspiring mediocre technical institutes and colleges located in small towns producing “graduates” by the thousands with high expectations. These youths thought they were going to get well-paid, secure jobs in the cities. Instead, they swelled the ranks of the educated unemployables living on the pavements and in the slums in the metropolitan cities of India.

Why unemployable? Because their paper degrees had no value. The certified doctors, teachers, and engineers produced by the thousands every year are paper experts without any practical experience. They are caught up in a system that is not accountable to the people it is supposed to serve and produces insufficient jobs to absorb the number of job seekers. Civil engineers build roads that do not last; water engineers build tanks that collapse or crack and cannot be used; doctors focus on curative approaches and know little or nothing about preventive health. So in the absence of jobs but still hoping for any job, they live an inhuman existence in appalling urban slums. The humiliation and scorn they would face on returning to the village prevent them from going back. Anyone going back to the village is considered a failure and the shame is shared by the whole family.

When the youth fled, they took with them the dying hopes of their parents—weavers, blacksmiths, potters, builders, carpenters, farmers—to pass on the traditional skills to the next generation. They left behind not only their families but also the knowledge their elders had collected over the generations to adapt to local conditions. This was knowledge that no formal educational system valued, but it was critical for developing a community with dignity and self-respect. The formal educational system had made them look down on their own roots.

For me, living and working in the villages for five years as an unskilled laborer digging and blasting wells and meeting with very ordinary poor people was an extraordinary experience. Between 1967 and 1971, I went through an “unlearning” process that provided the seeds for the humble beginning of the Barefoot College.

Over the last 40 years, what we have “unlearned” is our gross underestimation of people’s infinite capacity to identify and solve their own problems with their own creativity and skills, and to depend on each other in tackling problems.

What I learned is that empowerment of the marginalized rural poor is about developing that capacity to solve problems, to make choices, and to have the confidence to act on them.

On a different front, the college understood the specific real needs of the rural poor. These people needed to assert their identity and demonstrate that their knowledge and skills

were not outdated, second-rate, or irrelevant. They needed a college dedicated to their specific and special circumstances, and one located in a remote rural area. They needed a place where they could feel a sense of ownership, where their self-respect and self-esteem could be developed gradually over the years.

The Barefoot College acts as a counterpoint both to the incredible ignorance and arrogance the formal system displays and to its belief that it makes an indispensable contribution to tackling poverty; in reality that approach is counterproductive, even dangerous.

### **What is Barefoot College?**

As an organization, Barefoot College is the only college in India that follows the lifestyle and work style of Gandhi. It is the only college built by the poor, for the poor, and for the last 40 years, managed, controlled, and owned by the poor. Underlying the Barefoot approach is a firm belief in the knowledge, creativity, practical wisdom, and survival skills of the marginalized poor—possibly the only answer to making communities self-reliant and sustainable. For an unemployed and employable semi-literate rural youth to be providing vital services in a village, replacing an urban, paper-qualified doctor, teacher, or water engineer is a totally revolutionary idea. And yet, this is what happens at the Barefoot College every day.

It is the only college where paper degrees, diplomas, and doctorates are a disqualification because people are judged not according to their degree of literacy or academic distinction, but by their attributes: honesty, integrity, compassion, practical skills, creativity, adaptability, willingness to listen and learn, and ability to work with all sorts of people without discriminating.

The term “barefoot” is both symbolic and literal. Those who work, teach, learn, and “unlearn” and provide a technical skill without a paper degree issued by the Barefoot College go barefoot and remain so after they return to their own villages. Their goal is not to change their lifestyle but to gain the basic skills they need to provide to their own communities a vital service, one that urban professionals are currently trying to provide, most often unsuccessfully. Meanwhile they are maintaining a healthy and sustainable lifestyle for themselves and their community.

The Barefoot College is a radical departure from the traditional concept of a “college” because it encourages a hands-on learning-by-doing process of gaining practical knowledge and skills rather than written tests and paper-based qualifications. It promotes and strengthens the kind of education one absorbs from family, community, and personal experience. It deliberately confers no degrees, with a view to reversing migration. If one can improve the quality of life in one’s community by providing a vital service, why would anyone in their right mind want to live an unspeakably miserable existence in the urban slums? In any case, because barefoot professionals do not have paper certificates, no one in the urban areas, sadly, will seriously value their skills.

The ideology of the Barefoot College has four key components: Alternative Education, Valuing Traditional Knowledge and Skills, Learning for Self-Reliance, and Dissemination.

### **1. Alternative Education**

First, the Barefoot College demystifies education, taking Mark Twain to heart: “Never let



School interfere with your Education.” Mahatma Gandhi believed that giving more importance, value, and relevance to practical skills and applying traditional knowledge to solving day-to-day problems was essential for the development of rural India. Gandhi’s thoughts live on in the Barefoot College. Living conditions for everyone are simple and down to earth (literally!). Everyone sits, eats, and works on the floor. No one can receive a salary of over US \$150 a month.

## **2. Valuing Traditional Knowledge and Skills**

Second, the Barefoot College gives priority to the ideas, thoughts, and wishes of the rural poor. The college respects and emphasizes the importance of traditional knowledge, skills, and practical wisdom. It values keeping the oral tradition alive from father to son. This type of education is deeply rooted in long experience facing the challenges of living in particular circumstances and can never be replaced. The focus of the college is to make the young men, women, and children living in the village aware of this precious resource so that eventually they will stay in their villages and not migrate to the cities to end up living in a slum.

This is a major reason why the college places no importance on urban experts with paper degrees and qualifications who want to participate in it. In fact, people may be disqualified if they have too many paper qualifications. Sadly, 40 years of exposure and experience in rural India has taught us that most people with high-level paper qualifications are unfit (and misfits) when it comes to living and working in remote rural areas. They do not have the patience, humility, listening skills, open minds, tolerance, or capacity to show respect for traditional knowledge and skills.

## **3. Learning for Self-Reliance**

Third, Barefoot College enhances the self-confidence and competence of the poorest of the poor by providing them access to learning that enhances their ability to serve their own community, thus making them more confidently self-reliant. Over the last 40 years, thousands of unemployed and unemployable rural poor have been selected and trained as barefoot educators and technologists.

The criteria for selection are simple. We select only those village youth—both men and women—who are illiterate, semiliterate, or barely literate and who have no hope of getting the lowest government job. They have been trained as “barefoot” educators, doctors, teachers, engineers, architects, designers, communicators, hand pump mechanics, and accountants. They have demonstrated that “experts” from the urban areas with paper qualifications are not really required to make villages self-sufficient and sustainable because these trained “barefoot” experts can do the work themselves.

In keeping with the Barefoot philosophy, each operates independently, defining its own curriculum but keeping a few non-negotiable tenets at the core of their operations:

*Equality.* All people in the college are equal regardless of gender, caste, ethnicity, age, and schooling. In practical terms, this means the college has no hierarchy. The founder and director of a college have the same say and status as the new barefoot accountant who has just joined it and the physically challenged barefoot operator who answers the phone.

*Austerity.* Everyone in the college receives a living wage, not a market wage. The maximum wage anyone can earn is US \$150/month; the minimum is about half that at 73 Indian rupees per day. Living conditions focus on basic needs and are designed to minimize waste.

*Collective Decision-Making.* Decisions are made collectively, not by individuals in isolation. For example, the salary each person receives is decided on by everyone in the organization; the process is based on a points system in which each person evaluates himself and everyone else according to several criteria.

Barefoot College is also the only fully solar-electrified college based in a village in India. Starting in 1989, barefoot solar engineers installed a total of 40 kilowatts of solar panels and 5 battery banks, each containing 136 deep-cycle batteries. The solar components (inverters, charge controllers, battery boxes, stands) were all fabricated in the college itself.

### **Empowering Rural Women**

Only in the late 1980s did Barefoot College begin to recognize the potential of illiterate and semi-literate women to succeed in these non-traditional areas. As we have implemented this approach over the last 25 years, the women we have worked with have shown an awesome capacity and confidence to provide a service to their communities and to destroy stereotyped images and roles in the process.

Today many women in non-traditional roles are serving their own communities. “Barefoot” women are working as night school teachers, hand-pump mechanics, solar engineers, water engineers, architects, masons, and fabricators of solar cookers. Illiteracy has never been considered a barrier to women developing themselves as barefoot professionals.

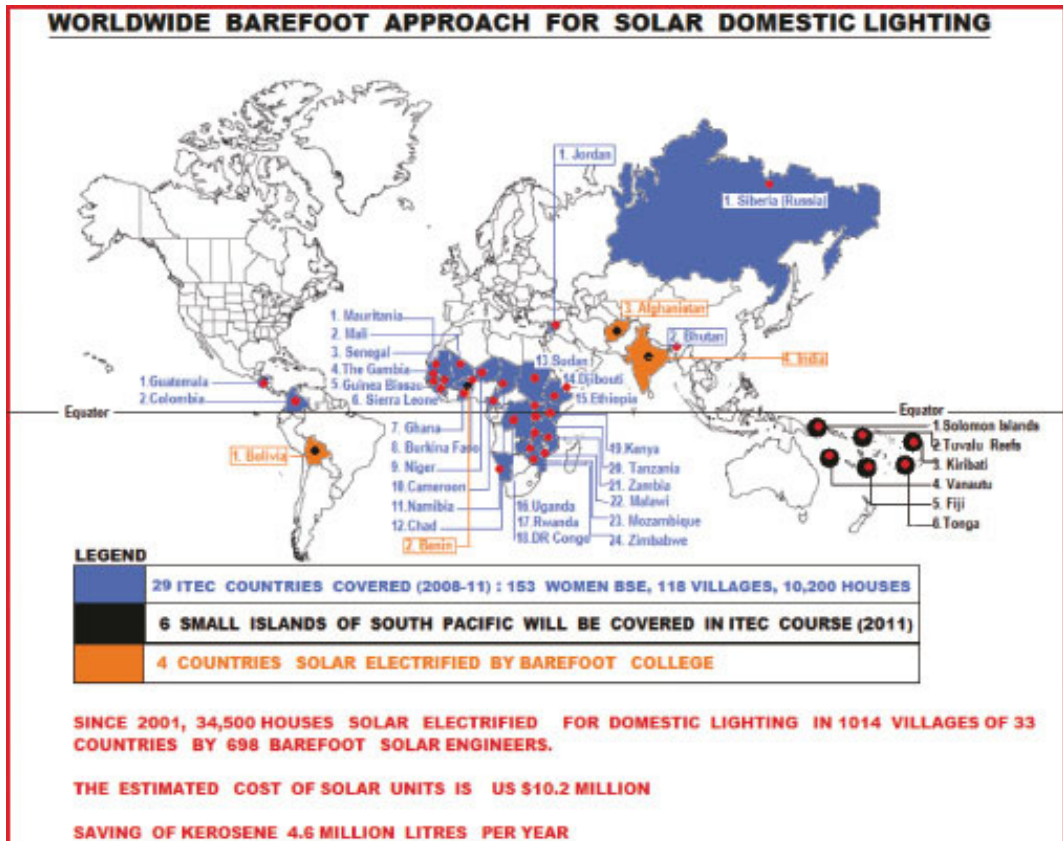
Illiterate women are handling computers and training unemployed youth in feeding technical, health, and literacy data to our organization.

Some programs cover areas such as water and education, where women have traditionally been very active, but their role in spreading solar technology is totally new for them, although it does build on their traditional responsibility to maintain the supplies of kerosene for lighting and fuel for cooking.

What is remarkable is that for the first time sophisticated solar technology has been demystified, and simple village women have demonstrated how effectively they can manage and control it to improve their quality of life. They now have the opportunity to develop their competence and confidence to handle technology, providing services to their own community that give them a new level of acceptance and the respect they deserve.

What is innovative is involving the whole community in selecting semi-literate women as engineers to provide a vital and non-traditional technical service in an area not generally associated with rural women. It also requires them to develop systematic leadership skills, persuading the community to pay a monthly contribution for the repair and maintenance of the solar systems they have installed in each house in their own village. Where this system was first adopted, the household contributions have been coming in regularly for the last four years.

## Empowered Barefoot Women around the World



The demystified and decentralized barefoot approach of solar electrifying villages primarily in the South would not have been possible without PARTNERSHIPS.

Under a unique scheme of the Government of India providing financial support called India Technical Economic Cooperation (ITEC) over 200 illiterate grandmothers from nearly 30 LDCs have been trained at the Barefoot College. Nearly US \$ 700,000 have been spent on air fares and training costs between 2009-2011.

The hardware (solar equipment) has been provided under a Global Agreement with the GEF Small Grants Programme of the UNDP covering Uganda, Niger, Chad, Ethiopia, Ghana, Mozambique, Rwanda, Burkina Faso, Cameroon and Kenya.

### Profiles:

Fatuma Abubker Ibrahim, one of the Barefoot Solar Engineers of Ethiopia, lives in the remote village of Beyahile, in Afar state. Fatuma is 20 years old, single, attended primary school, and lives with her parents. She and her family tend to their three cows, 30 goats, and three camels on two hectares of land. Since July 2006, Fatuma has also been looking after 90 fixed solar units, 90 solar lanterns, and one rural electronic workshop in Beyahile and nearby villages.

Awatif Abduraheman lives in the remote village of Benishangul in Ethiopia. Semiliterate, she is 25, married, and has three sons. She and her family make their living farming their four hectares. Awatif also does domestic work, and since July 2006 has been installing, maintaining, and repairing 80 solar units in her village and others nearby.

Aminata Woulet is 40 and lives in Tinjambane village in Timbuktu in Mali. A widow since 1994, she has never been to school, but can read and write. She has other skills: dyeing cloth with indigo, making leather crafts, and looking after goats.

Haja Woulet is 32, a widow with one 10-year-old daughter. She is illiterate and lives with her parents, also in Tinjambane.

Together Aminata and Haja solar electrified their own village of 92 houses in 10 days; it was the first village in Mali where rural women installed solar electricity.

Aji Kamera lives in the village of Kafenkeng in The Gambia. She is over 30, married with four children, and a Muslim. She attended school up to class 7 but then dropped out. She owns a small plot, on which she keeps three goats, a cow and four chickens. She installed solar electric units in 40 houses in one week; they have been functioning for nearly a year now.

Nancy Kanu, a Muslim, lives in KontaLine in Sierra Leone. She is 40 years old, has six children, and is semi-literate. She owns one sheep and one goat. Single-handedly, she solar electrified her village of 35 houses and was the first women solar engineer in Sierra Leone.

That same kind of empowerment has now spread to women beyond India into other parts of Asia and Africa. For the past 11 years, the Barefoot College has been training semi-literate and illiterate rural women to assemble, install, repair, and maintain solar photovoltaic systems. Once selected by their village to undergo solar training for six months at the Barefoot College, the women come to Tilonia and acquire the competence and confidence to fabricate, install, repair, and maintain sophisticated solar units. They then return to their communities to install solar systems in each house in the village, thus establishing their credibility in the eyes of each family that pays a monthly contribution for them to repair and maintain the units.

Never in the history of Afghanistan has an illiterate woman left her house, her village, and her country for six months to train as a solar engineer in India, but that is exactly what 26-year-old Gul Zaman, from the village of Katasang in Daikundi province, did in 2005. She and her 30-year-old husband Mohammed Jan came to Tilonia for six months. They have a small plot of land to feed 10 people, and work as day laborers for over 200 days each year. Together the couple gently created history by solar electrifying their own village of some 50 houses, and the units have continued functioning since September 2005.

Electrifying houses provides additional income and a new level of confidence and leadership to the women who train in Tilonia as solar engineers and then serve as role models for young women in their villages. It also opens up other income generating opportunities for all women, who can then use their evening hours to manufacture handicrafts and other goods for sale.

## **Challenges and Lessons Learned**

What is pioneering and innovative about the Barefoot approach is the emphasis and respect it gives to applying the knowledge, skills, and practical wisdom of the rural poor—which may

be the only way to make communities self-reliant and sustainable.

With roots in the village community and a deep-rooted respect for the proper and wise use of water, air, earth, and the sun, Barefoot Educators have set an example of how NOT to waste or overexploit nature resources. They are a living testimony to Mahatma Gandhi's famous saying, "The world has enough for every man's need but not for one man's greed."

The approach has had a considerable impact in changing the mindset of urban "experts" and influencing their attitudes toward the idea of having the poor identify and solve their own problems.

Development with dignity means development with less dependence on urban skills and more self-respect. The Barefoot approach has worked. The results are there for everyone to see and feel.

## **Major Challenges**

### **1. Promoting a Different Vision of Development**

The first challenge has been to convince people that a different vision of development is possible. Throughout its brief lifetime, the college has worked hard to convince urban people that semi-literate men and women from any village in India—indeed, any remote village in the world—can competently provide professional services to their own communities. While the results of the college's work speak for themselves, this task continues to be a daunting one since it involves changing long-held stereotypes, mindsets, and attitudes towards the poor. Still, a great many people, including many who hold important positions, have learned about its activities and have traveled to Tilonia to witness its work first-hand. We make progress with each new person who comes to the campus, as they absorb the spirit of the approach and are inspired to help disseminate and expand it within their own spheres of influence.

### **2. Dealing with Success**

The second challenge has been dealing with success. The college has demonstrated that semi-literate rural women can solar-electrify remote villages and look after solar units more competently than paper-qualified solar engineers. In so doing, it has turned established perceptions upside down, and debunked the basic assumption that formal education is required for development work. Unfortunately, in challenging established thinking on development, the college has generated hostility and jealousy, and has made many enemies.

Those most hostile to the Barefoot approach are people who have invested a great deal in acquiring an education through the official system and then applying that misguided "expertise." The very idea of semi-literate women being able to manage and control initiatives at the village level undermines those hard-earned credentials and credibility and even threatens the existence of their jobs. Indeed, one result of the Barefoot approach in India, where it is most widely replicated, has been the replacement of cost-intensive initiatives and jobs by low-cost and intensive initiatives, providing gainful employment within the villages.

### **3. Learning from Failure**

The third major challenge has been to learn from successful failures. Taking risks, trying new ideas, failing and trying again is a process that is respected in the Barefoot College because we recognize that we should learn as much from failure as from success. But the formal education system has no room for failure. In that system, failure is considered a matter for shame and regret. Barefoot College gives everyone involved the opportunity to make mistakes and learn from them. Any organization worth its salt has to go through crises. The crises can either break the organization into little splinters or eventually make it stronger. In the early 1980s, as decision-making power within the college gradually shifted from the urban professionals to the rural youth, many of the former left to join other organizations or opted back into the system. That was a crisis that led to uncertainty and insecurity. But the college learned two important lessons that have since guided and influenced future decisions.

1) Do not depend on urban professionals because they will not stay there all their lives. In a world dominated by materialism, they may be tempted to use the college as a stepping-stone to secure better-paying jobs. The answer has been to develop the capacity, confidence, and competence of the rural poor to provide their own services. After all, they have the knowledge and the skills that have stood the test of generations before the urban-trained doctor, teacher, and engineer turned up on the scene. Why not, as a policy, move in that direction? That is what we have done and it has been a key to our success.

2) You do your best work when you are insecure. When your back is against a wall and you have nowhere to run and no one to turn to, you have no choice but to face the consequences. When a crisis arises and could possibly lead to violence, urban professionals normally do not have the staying power. Because they have somewhere to run to, they are not prepared to see the crisis through.

In many ways, the Barefoot College is a microcosm of a more just and creative world. Special emphasis is placed on giving the physically and mentally impaired the same opportunities to work and belong to society as the physically and mentally able. People who need medication but cannot afford to pay the market price are charged 10 percent of that price by the health center; if they are really struggling they are given the medication free of charge. Waste paper from offices is recycled to make bags, pencil holders, origami, and teaching tools—which are in turn supplied to local night schools. Office equipment, fans, and lights are powered by solar panels on the roofs of office buildings; living quarters are similarly supplied with solar energy. Drinking water and sanitation needs are met by a combination of rooftop rainwater harvesting and local hand pumps; and the local environment is strengthened by a network of troughs that harvest rainwater and feed it into a large open well used to recharge the water table. Discarded intravenous drip bottles and tubes are disinfected and used to irrigate plants on the campus in this semi-desert area.

The Barefoot College has been putting into practice an idea first espoused by Mahatma Gandhi: that the resources required to develop poor communities lie within the bounds of those communities. Human, technical, and financial resources need not come from outside in order for a community to bring about fundamental change and improve its quality of life. Too often, community resources are neglected, looked down upon, and considered inferior just



because they have not conformed to the formal requirements of the education system.

However, just as important, the college has demonstrated to the villagers themselves that any one of them, man or woman, with little or no educational qualifications, can learn to provide basic services to their own community. To be able to change the mindset of poor rural people who have been made to feel that they cannot do it themselves is an enormous contribution. Less developed countries would benefit immensely from adopting this Barefoot approach. It can eventually transform the outlook not only of development officials, but, most importantly, of the rural poor themselves, instilling in them a “can do” attitude to improving their own lives, and replacing the apathy and hopelessness they may feel after so many years of coming up against an irresponsible system that does not respect their abilities.

First they ignore you, then they laugh at you, then they fight you, and then you win—  
*Mahatma Gandhi*

### Slide 1

The Barefoot Architects



### Slide 2

Built at \$1.50/sq.ft by 12 Barefoot Architects in 3 Years



### Slide 3

Paving a Village Road



### Slide 4

Underground Water Strage



### Slide 5

The First Barefoot Solar Engineer of India:  
Fully Solar Electrified the Campus between 1986 and 2000



### Slide 6

The campus has 40 KWs of solar panels.



### Slide 7

Solar Cookers



### Slide 8

Semi-literate Women Barefoot Dentists



**Slide 9**  
**Handloom-weaving**



**Slide 10**  
**Soldering Work**



**Slide 11**  
**Teaching Computer Skills**



**Slide 12**  
**Reverse Osmosis Membrane Water Filtration**



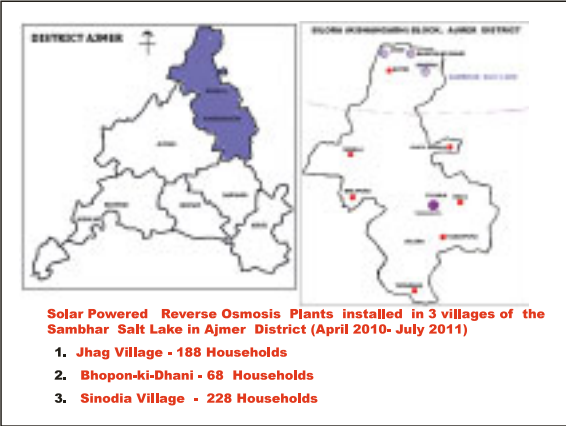
**Slide 13**  
**Night School**



**Slide 14**  
**Reservoir with Dammed Water**



**Slide 15**  
**Solar Powered Reverse Osmosis Plants Locations**



**Slide 16**  
**INDIA: Solar Lighting and Maintenance (1984-2011)**





## Slide 17

### Assembling Solar Lanterns



## Slide 18

### Africa: Solar Lighting (2004-2011)



## Slide 19

### Worldwide: Solar Lighting (1984-2011)

