

STRATEGIC PLAN EXECUTIVE SUMMARY

2012-2015 STRATEGIC PLAN executive summary

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Stanford Woods Institute for the Environment, 2012. © 2012 by the Board of Trustees of the Leland Stanford Junior University Front Cover Photo: Christine Tam



DIRECTORS' LETTER

It is possible to feed people, power communities and provide clean water while protecting and nurturing the planet for generations to come.

The challenges of providing food, energy, water and other human needs are growing along with the global population and rising consumer demands. The pressures on earth's already stressed life support systems are mounting. Today's decisions will determine the health and very existence of oceans, forests, freshwater and other vital natural resources needed to sustain people and the planet.

The Stanford Woods Institute for the Environment is seeking solutions to these interconnected threats though pioneering approaches that transcend disciplinary boundaries. Our leading experts and scholars comprise 10 percent of Stanford University's faculty and scholars and represent all seven Stanford schools. They are working together to produce cross-cutting environment and sustainability research informing critical decisions facing policymakers today.

Eight years after its creation, the Stanford Woods Institute is at an exciting and expansive stage of development. To guide this next stage of growth, we conducted a major planning process. We solicited input from a broad range of interested parties including faculty, staff and external stakeholders, collected data and reviewed our performance. Based on this process, we developed a disciplined long-term approach to expanding the scope and impact of our work.

Our strategic plan provides a clear blueprint for the Stanford Woods Institute's future. At its core, the plan shows the way toward building on our strengths as a nexus for innovation and the hub of environment and sustainability research at Stanford. It outlines a focused direction for maximizing our research's effectiveness, better informing decision-makers and educating leaders around the world.

Moving forward, we remain committed to putting ideas into action that will solve the environmental challenges of today and tomorrow.

We appreciate the generous support of the David and Lucile Packard Foundation in funding our strategic planning process.

Sincerely,

Deblie Drake Dunne

Debbie Drake Dunne Executive Director

Jeffrey R. Koseff Perry L. McCarty Director

San H. Car

Barton H. "Buzz" Thompson, Jr. Perry L. McCarty Director

Vision

We envision a world in which societies meet people's needs for water, food, health, energy and other vital services while protecting and nurturing the earth.

Mission

To produce breakthrough environmental solutions that protect and nurture our planet to meet the vital needs of people today and of generations to come.

PROFILE

Overarching Goals

TO CATALYZE

and sponsor interdisciplinary research that yields solutions to global environmental sustainability issues.

TO ADVANCE

environmental decisions made by governments, NGOs and businesses.

TO DEVELOP

global environmental leadership for today and the future.

Who We Are

The Stanford Woods Institute for the Environment is the hub of interdisciplinary environment and sustainability research at Stanford University. We are committed to helping produce solutions to the major sustainability challenges facing the world. Comprising 10 percent of Stanford's faculty and research professionals, our 149 fellows and affiliated faculty are leaders in their academic fields. They bring expertise from across Stanford's seven schools – business, earth sciences, education, engineering, humanities and sciences, law and medicine – to our pioneering work on environment and sustainability issues.

Who We Reach

EXTERNAL AUDIENCES

Government, NGOs, the business sector, foundations, donors and other engaged individuals.

INTERNAL AUDIENCES

Stanford faculty and researchers, leadership, students, postdoctoral scholars and staff.

PROFILE

How We Work

We find ourselves at a critical time in earth's history. The health of our oceans, climate, freshwater, land and air has declined precipitously. To tackle these challenges, the Stanford Woods Institute for the Environment sponsors solutions-focused research (more than 80 projects are underway around the world), educates leaders and advances environmental decisions. Key to our approach are research programs and centers including the Center for Food Security and the Environment, the Center for Ocean Solutions, Environmental Venture Projects, the Global Freshwater Initiative, the Natural Capital Project, the Program on Water Health and Development and the Water in the West program.

WE STRIVE TO:

- link knowledge to action to produce breakthrough solutions;
- draw on the expertise, ingenuity, passion and pioneering spirit of faculty across all of the university's seven schools;
- pioneer approaches that transcend discipline and sector boundaries;
- inform decision-makers with unbiased scientific data and information;
- educate global leaders around the world;
- partner with leading entities including government, NGOs, business and academia across multiple disciplines.

Measures of Success

Over the next four years the Stanford Woods Institute will be measuring progress toward the following targets. We will refine these goals over the life of the strategic plan.

BY 2016.....

- We will have launched new research centers and programs to address emerging issues like climate adaptation and sustainable development.
- The interdisciplinary breadth and depth of our solutions-focused research and teaching will have increased with the addition of at least five new faculty members and scholars.
- Our faculty, scholars and students will play a greater role informing policy makers in our state and national capitals, through a new Stanford Woods office in Washington, D.C., and expanding advisory roles in business, government, the NGO community and science boards.
- The Stanford Woods Institute will be known internally and externally as a leading go-to resource on global environment and sustainability issues.
- Our leadership programs will have attracted a highly diverse, influential set of participants from the highest levels of leadership in the public and private sectors.
- Students graduating from programs affiliated with the Stanford Woods Institute will be serving in key leadership roles around the world, catalyzing practical solutions for people and the planet.

AREAS OF FOCUS

The areas of focus we use to categorize our work – **Research**, **Educating Global Leaders** and **Advancing Environmental Decisions** – are essential and interlocking pieces of our overall strategy. Work in each area informs and advances work in the others. We pursue our mission through a collaborative, interdisciplinary approach to research by exceptional faculty and scholars, education of global leaders and guidance of decision-makers around the world.



RESEARCH



EDUCATING GLOBAL LEADERS



The world's sustainability challenges are too complex to solve by traditional single-discipline approaches alone.

We must work on far broader interdisciplinary scales than we ever have. Stanford has fundamentally changed the way it conducts environmental research, and the Stanford Woods Institute has led the charge. Our 149 fellows and affiliated faculty – 10 percent of all Stanford faculty and scholars – conduct interdisciplinary environmental research that transcends the boundaries of the university's seven schools.

Key Strategies

- Strengthen existing and create new interdisciplinary programs and partnerships.
- Leverage Stanford environmental research funding for maximum impact.
- Build a strong community / network of cross-sector, interdisciplinary scholars.
- Recruit, develop and engage top faculty, scholars and graduate students.

Environmental Venture Projects (EVPs)

Promising research needs support to advance from idea to action.

To catalyze transformative environmental and sustainability research around the world, we have awarded millions of dollars in EVP seed grants to interdisciplinary research teams from all seven of Stanford's schools and 30 of its departments. These innovative research projects focus on finding solutions to challenges ranging from the protection of endangered species in California to the delivery of clean drinking water in Africa. EVPs have led to development of natural resources valuation software and biodegradable building materials.



Planting the Seed for a National Water Center

An EVP grant, along with a Woods Uncommon Dialogue, played an important role in helping Stanford Woods Institute Senior Fellow Dick Luthy secure an \$18.5 million National Science Foundation grant for a center on urban water infrastructure and water reuse. "None of it would have happened without the Woods support," Luthy recently wrote. The NSF Engineering Research Center (ERC) on Reinventing the Nation's Urban Water Infrastructure will look at ways to improve the delivery of water to cities and suburbs, including ecosystem enhancement and

habitat creation using recycled water. Luthy, the center's director, and his team will also engage regional policymakers and managers to spur implementation of these types of projects. The center involves faculty and students from Stanford, UC Berkeley, the Colorado School of Mines and New Mexico State University. The center has its roots in a 2008 EVP by Luthy and other researchers.

Climate

Climate change is one of the most complex environmental challenges the world faces today.

Its impact encompasses physical, ecological, economic, political and ethical issues. Public and political opinions may be divided on what drives climate change, but the science is undeniable. We must seek ways to adapt to climate change on multiple fronts, even as we address its underlying causes. Stanford Woods Institute researchers are creating climate models for economic impact studies and energy and environmental policymaking. Some are assessing climate vulnerabilities and shifting public perspectives on climate change issues. Others are looking closely at ways to mitigate and adapt to impacts. To this end, we are exploring the possibility of establishing a program or center focused on climate adaptation.

Public Opinion on Climate and Energy

The Stanford Woods Institute for the Environment has sponsored a series of surveys conducted by Stanford Professor Jon Krosnick illuminating Americans' views on energy and climate change. Krosnick is a Stanford Woods Institute senior fellow (by courtesy) and a professor in the Departments of Communication, Political Science and Psychology.



Support for Climate Change Action Dips

Americans' support for government action on global warming remains high but has dropped during the past two years, according to a recent survey by Krosnick, a Stanford Woods Institute senior fellow. Economics doesn't appear to have played a role. The survey shows that support for a range of policies intended to reduce future climate change dropped by an average of five percentage points per year between 2010 and 2012. In a 2010 Stanford survey, more than

three-quarters of respondents expressed support for mandating more efficient and less polluting cars, appliances, homes, offices, and power plants. Nearly 90 percent of respondents favored federal tax breaks to spur companies to produce more electricity from water, wind and solar energy. On average, 72 percent of respondents supported government action on climate change in 2010. By 2012, that support had dropped to 62 percent. The drop was concentrated among Americans who distrust climate scientists, even more so among such people who identify themselves as Republicans. Americans who do not trust climate science were especially aware of and influenced by recent shifts in world temperature, and 2011 was tied for the coolest of the last 11 years.

Ecosystem Services and Conservation

The full value of our natural resources – oceans, forests, freshwater, open landscapes and more – is still being discovered.

The planet's diverse ecosystems provide a broad range of natural benefits and services with value that extends far beyond the traditional marketplace. We are working to quantify that "natural capital" – what people want or need from nature – and forecast returns to society on investments in nature. To that end, we are delivering knowledge and developing clear, credible and practical software-based tools that help natural resource managers around the world maximize the societal value of their land and water.

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Natural Capital Project

A joint venture with the University of Minnesota's Institute on the Environment, The Nature Conservancy and the World Wildlife Fund, the Natural Capital Project works with experts and leaders of key institutions to meld world-class research on environmental economics with influential conservation programs. The center's signature tool is the Integrated Valuation of Environmental Services and Tradeoffs (InVEST) family of software that enables decision-makers to quantify nature's values, assess the tradeoffs associated with alternative water and land-use choices and integrate conservation and human development into land-use, coastal marine and investment decisions.



InVEST in China

The Natural Capital Project recently took its InVEST tool to China. The software will be used to conduct China's first-ever national assessment of ecosystem services, spanning a wide range of ecosystems, services and scales. The Natural Capital Project is also working with Chinese officials to use InVEST as a tool for implementing a new system of conservation areas that will span 24 percent of the country's land area. These massive initiatives open a new paradigm for integrating ecosystem functions (e.g., clean water and carbon storage) and human development to achieve improved outcomes for both.

Food Security

About one billion people go to bed hungry most nights.

Improving food security at global, regional and local scales requires more than a direct focus on food availability, access and utilization. Food security is intertwined with other key issues such as governance, national security, gender, education, infectious disease, water and nutrient management, energy and climate change. Our approach encompasses this broader set of issues in order to design new solutions to global hunger and environmental degradation, and to provide sound policy advice.

Center on Food Security and the Environment (FSE)

FSE, a joint effort with Stanford's Freeman Spogli Institute, focuses on a broad array of global issues ranging from African food systems to the causes and consequences of China's rapid rise in aquaculture. The center links with various initiatives at the Stanford Woods and Freeman Spogli institutes to examine agricultural adaptation to climate variability; domestic water use; irrigation; rural health; sustainable fisheries, and food security impacts on national and international security. FSE also works to more firmly embed nutritional security concepts – especially the role of nutrients, freshwater and fertilizer humans and plants need to thrive – in Stanford research and teaching. FSE is mentoring the next generation of food policy leaders through an expanded program of postdoctoral scholars and is expanding efforts at distance learning with programs in sub-Saharan Africa and Asia.



Advancing New Ideas and Food Security Policy Through Distance Learning

FSE is hosting a 2-year, 15-lecture symposium series that positions the center to become a major distance-learning source in global agriculture and food policy. The series brings together food and agricultural development policy experts to address the major themes of hunger and rural poverty, agricultural productivity, and resource and climate constraints on agriculture primarily in sub-Saharan Africa and South Asia. The series, targeted at advanced degree programs and mid-career policy professionals, emphasizes the implementation of policies to enhance

agricultural production, incomes and resource stewardship. The lectures address the challenge of supplying sufficient food at reasonable prices without destroying the environment in the process. Symposium speakers have included Stanford Woods Institute fellows David Lobell and Rosamond Naylor.

Freshwater

More than one billion people lack safe drinking water, and freshwater is being depleted rapidly in many areas.

We are finding practical ways to meet growing demand for freshwater, both in developed and developing nations, including the use of recycled water and water resources. We are also researching ways to protect groundwater, restore degraded waterways, improve water-use efficiency and reduce the impact of agriculture and other land uses on water systems.

Water in the West

The western United States needs a water system that is sustainable from economic, ecological, political, institutional, equitable, scientific and legal points of view. The Water in the West program addresses multiple dimensions of realistic, integrated solutions to the region's water challenges. The program's projects include improving groundwater management, expanding water reuse and sustainability and developing performance measurements for water systems.



Scientists Helping Groundwater Managers

What can scientists do to help groundwater managers? That was the underlying question at an April 2012 Uncommon Dialogue hosted by the Water in the West program. The event brought together groundwater managers from across California and researchers from Stanford, UC Davis, the University of Idaho, the Idaho Department of Water Resources, the U.S. Geological Survey and the University of Calgary. The diverse stakeholders focused on forging partnerships to develop practical solutions using the latest in groundwater technology. They discussed recent

research and swapped management lessons learned. The Water in the West program is working to match managers and scientists based on technology needs and research projects program.

Global Freshwater Initiative (GFI)

Building on water supply research conducted in India and Mexico, GFI researchers are developing strategies to promote the long-term viability of freshwater supplies for people and ecosystems threatened by climate change, shifts in land use, increasing population and decaying infrastructure. Stanford researchers and local collaborators are working to generate policyevaluation models, provide targeted analyses of viable policy interventions and train the next generation of water resource experts.



Planning a Desert Water System

GFI has initiated a project aimed at water resources policy evaluation in Jordan, an arid country where future natural and social changes set the stage for regional and nationwide water supply failures. The project is an interdisciplinary collaboration among Stanford researchers to build a multi-agent model for policy evaluation that, for the first time, captures the complexity of interactions between water suppliers, users and managers across an entire water sector in a

changing hydrologic environment. This project aims to identify innovative demand-oriented policy solutions for a water system that has exhausted traditional supply sources and is subject to future stresses including climate change, rapid refugee immigration, groundwater depletion and competition for water among urban and agricultural sectors.

Oceans

Humans depend on the ocean to help stabilize the climate, provide food and support livelihoods.

Stanford Woods Institute researchers are finding ways to meet challenges facing ocean health by applying the best available science and policy expertise to ocean governance, ecosystem resilience, climate change impacts such as ocean acidification and sea level rise and other stressors to marine environments.

Center for Ocean Solutions (COS)

COS is a collaboration among Stanford University (through the Stanford Woods Institute and the Hopkins Marine Station), the Monterey Bay Aquarium and the Monterey Bay Aquarium Research Institute (MBARI). COS combines Stanford's expertise in marine biology, oceanography, engineering, economics, law and policy with the aquarium's unparalleled public education and outreach and MBARI leadership in deep-sea technology, exploration and monitoring. Beyond developing knowledge to solve ocean challenges, COS researchers and staff translate marine science and policy research for government, business and nonprofit sector decision-makers. COS educates current and future leaders through graduate-level education and research opportunities, highlights marine issues in the media and sponsors outreach programs to inform and empower action by existing and emerging leaders and decision-makers within the public and private sectors.



From the Ocean to the White House

COS Executive Director Meg Caldwell and policy analyst Ryan Kelly met with White House science advisors recently to discuss ocean acidification and a report on the subject that COS produced for the State of California. The report shows that increasing ocean acidification – brought on by increased atmospheric carbon dioxide and other pollutants such as fertilizer run-off – could pose significant threats to ocean resources for food, recreation, tourism dollars and other ecosystem services. Worldwide, carbon dioxide pollution is changing ocean chem-

istry more rapidly than anything in at least the past 300 million years. As of 2009, the U.S. ocean economy accounted for \$222 billion in revenue and 2.5 million jobs in coastal states alone. Protecting this economy will depend on more effective implementation of existing laws as well as increased monitoring, research and limiting of carbon dioxide.

Public Health

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Public health solutions must incorporate a multitude of contributing environmental factors.

We work with partners in low- and middle-income countries, primarily in Asia and Africa, to address challenges involving water supply, water quality, sanitation, hygiene, health, energy and food production. We are working to strengthen the scientific basis for water and sanitation decision-making, enhance developing countries' capacity for sustainable water and wastewater management and to improve the health and wellbeing of households in some of the world's poorest countries.



Program on Water, Health and Development (WHD)

Globally, about one billion people lack adequate freshwater supplies, and 2.8 billion lack basic sanitation. One result of this situation is that diarrhea – a preventable disease – kills an estimated 1.8 million people worldwide, the vast majority children under the age of five, every year. Working with partners throughout sub-Saharan Africa and Asia, WHD researchers are looking at ways to improve water supply and sanitation service delivery and enhance capacity for sustainable water and wastewater management.



A Shorter Walk to a Longer Life

A new study by Stanford Woods Institute researchers shows that reducing the amount of time spent fetching water can improve the health of young children in sub-Saharan Africa. The study, by Stanford Woods Institute Senior Fellow Jenna Davis and postdoctoral fellow Amy Pickering, found that cutting walking time to a water source by just 15 minutes can reduce mortality of children under 5 by 11 percent, and slash the prevalence of nutrition-depleting diarrhea by 41 percent. A possible explanation lies in water fetching's displacement of time for childcare,

food preparation, household cleaning and income generation.

More than a third of the world's population does not have potable water piped into the home. In sub-Saharan Africa, that number jumps to 84 percent. The study analyzed data from 26 African countries, where it is estimated that some 40 billion hours of labor each year are spent hauling water, a responsibility often borne by women and children. The study is the first known quantitative analysis of the relationship between the time devoted to fetching water and health outcomes.

Sustainable Development

Sustainable development requires integrated consideration of economic well-being, the environment and equity – as well as a special focus on growing urban regions.

We search for sustainable solutions that protect the environment while addressing related social and economic issues including education, health, social equity and infrastructure. We promote sustainable construction and design through research of materials, technologies and processes that will enable building and infrastructure systems to sustain both people and the environment.



Sustainable Development

Our sustainable development work falls into two categories. First, we are sponsoring diverse research on sustainable urban practices. Environmental Venture Projects include research into green adhesives for clean air buildings and sea-level-rise responses such as new land use regulations, insurance requirements and reactive engineering adaptation. Among the accomplishments of Stanford Woods Instituteaffiliated researchers are the development of biodegradable building wood substitutes and laser technology to rapidly assess human exposure to indoor airborne pollutants. Second, we are examining how low- and middle-income regions can improve their economics while protecting the environment.



INOGO Gets Going in Costa Rica

The Osa and Golfito Initiative (Spanish acronym: INOGO) is focused on developing a strategy for sustainable human development and environmental stewardship in Costa Rica's Osa and Golfito region. INOGO is designed to build on many previous efforts in the region, working hand in hand with Costa Ricans in local communities, the public and private sector and NGOs. The goal is to generate a living process for sustainable development led by Costa Ricans, especially the people of Osa and Golfito. A secondary aim is to provide useful decision-making

information and products to regional stakeholders in the region. To this end, locally trained staff have surveyed hundreds of area residents about how they perceive their communities' assets and challenges. These responses will serve as a basis for INOGO's diagnostic regional analysis and an interactive process to develop a sustainable vision for the region's future.

EDUCATING GLOBAL LEADERS

Environmental leaders need specialized skills, knowledge and networks to move ideas into action and support informed decision-making.

We are preparing students, scientists, professionals and decision-makers to serve as global environmental leaders for today and tomorrow. Our unique strategic approach uses newly developed modules to equip current and emerging leaders with communications and leadership skills, as well as methods for applying those skills for the greatest impact at Stanford and around the world. We help public- and private-sector leaders better understand and use science and innovation to address complex crosscutting environmental issues. This includes facilitating collaboration between academic scientists and a broad range of stakeholders, connecting discoveries and researchers with public policy and those who shape it.

Key Strategies

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- Enhance educational opportunities for students.
- Deliver leadership development programs for public- and private-sector leaders.
- Provide mentorship and internship opportunities for the Stanford Woods Institute community.



LEADERSHIP PROGRAMS

Economic Tools for Conservation

Comprehensive two-week training session in which NGO leaders from around the world learn to use economics more strategically and successfully in their conservation work.

First Nations' Futures Institute

Fellowship program focused on building First Nations' capacity by developing values-based leadership and integrated asset / resource management solutions.

Fisheries Leadership & Sustainability Forum (FLSF)

Partnership among four academic and policy organizations that provides professional development, continuing education and informative networking opportunities to regional fishery management council members.

Leopold Leadership Program

Fellowship program that provides outstanding academic researchers throughout North America with the skills, approaches and theoretical frameworks for transferring their knowledge into action and for catalyzing change to address the world's most pressing sustainability challenges.

Mel Lane Student Program

Grants for student-driven-and-managed environmental projects that make a measureable impact on sustainability issues through action or applied academic research.

Rising Environmental Leaders Program

New program that helps students hone their leadership and communications skills to maximize the impact of their research. In April 2012, the program hosted Stanford PhD students and postdoctoral scholars in Washington, D.C., as part of an intensive "boot camp" focused on advancing research through policy development, public service careers and network building.

Western Conservation Finance Boot Camp

Week-long training program to equip land trust professionals with the most effective, cutting-edge tools to succeed in any economy.



EDUCATION PROGRAMS

Mentoring Undergraduates in Interdisciplinary Research (MUIR) Program

Stipends for Stanford undergraduates conducting interdisciplinary environmental research with Stanford faculty during the summer.

Stanford Interdisciplinary Graduate Fellowship (SIGF) Program

University-wide program that awards three-year fellowships to outstanding doctoral students engaged in interdisciplinary research.

YES! (Young Environmental Scholars) Conference

Annual conference that brings together graduate students, professional school students and postdoctoral students across Stanford for a day of innovative dialogue, productive collaboration and real world problem-solving on pressing environmental topics with the goals of building a network of interdisciplinary problem-solvers and new solutions for the future.

ADVANCING ENVIRONMENTAL DECISIONS

Discoveries become solutions when scholars and key stakeholders join forces to inform decision-makers.

We move ideas into action by disseminating the results of our work to those who make and implement decisions that affect the environment. Along the way, collaborations with private and public institutions ensure our research is relevant and accessible. Through research briefs, solution summaries, newsletters and a quarterly research digest, we provide unbiased scientific data to help business, government and NGO leaders make informed decisions about environmental issues. Through a series of workshops and dialogues with public and private stakeholders, Stanford Woods Institute experts frame issues in neutral forums focused on finding workable solutions to sustainability problems. These interactions also help inform Stanford's environmental research.

Key Strategies

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- Convene top scholars, experts and leaders on key sustainability issues.
- Connect research to inform development of policy and management practices.
- Create transformational methods for communicating environmental knowledge.
- Provide key leaders with cutting-edge knowledge and decision-support tools.



Quarterly Research Digest

A new, in-depth review of significant ongoing research by Stanford Woods Institute faculty and scholars.

Briefs and Solution Summaries

Concise research summaries geared toward informing decision-makers about new scientific findings.

Uncommon Dialogues

Moderated conversations among researchers and government, NGO and business leaders as well as experts from Stanford and other academic institutions to develop practical solutions to pressing environmental challenges, guide leaders in making informed decisions for a sustainable future and inform environmental research.

Energy & Environmental Affiliates Program (EEAP)

A partnership between corporations and Stanford that provides opportunities to team with faculty and graduate students doing relevant research and to influence the direction of that research. EEAP also features symposia, workshops, networking opportunities and best practices forums.

Workshops and Salons

Forums that bring together business, government and NGO leaders to hear from Stanford experts about their research.

Newsletter

Monthly updates on Stanford Woods Institute research, people in the news, programs and events for internal and external audiences.

We appreciate the generous support of the David and Lucile Packard Foundation for funding our strategic planning process, and gratefully acknowledge our Advisory Council members for their steadfast guidance.

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