Strategies for Living in a Hotter/ Drier World

Systems and Systematic Design Workshop
Fall 2006
Institute of Design

Appendices

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Institute of Design
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Massive Change

Strategies for Living in a Hotter/drier World

Charter

Background

Global warming is now recognized as fact almost without question. Arguments to the contrary put forth twenty years ago are no longer credible, and only the most extreme critics still contend that the changes we see are natural, not caused by human activities. The question now is not whether global warming is taking place, but how serious its consequences will be.

Over the twentieth century, the Earth's average global surface temperature increased .6° Celsius (1.08° Fahrenheit). Estimates made in 2004 of the amount of warming we will experience in this century suggested a likely range of 2.4 to 5.4°C (4.3 to 9.7°F), but a more recent paper (2005) by a team of Oxford University scientists suggests a significantly hotter range of possibilities: 2 to 11°C (3.6 to 19.8°F), pushing the most likely value upward.

Darkening the picture further, the greenhouse gases already put into the atmosphere will have effects lasting centuries. The concentration of carbon dioxide and its greenhouse gas equivalents in the atmosphere before land-clearing and industrialization in the 18th century was about 265 parts per million (ppm). It is now nearly 400 ppm. To stabilize concentrations at 450-550 ppm will require major reductions in carbon emissions beginning immediately. And the 450-550 level is not safe; stabilization must be succeeded by reductions in concentration, which will take more than a century at natural rates of absorption. Warming at this magnitude is likely to be greater than any since the large and abrupt Younger Dryas event 11,000 years ago. "Warming as large and rapid as that projected for the twenty-first century might be expected to create severe problems for natural ecosystems and human societies. Indeed, evidence from past climate changes of similar magnitude point to major impacts, which, if humans had been present in numbers like today, would have been disastrous" (Pittock 2005, 21).

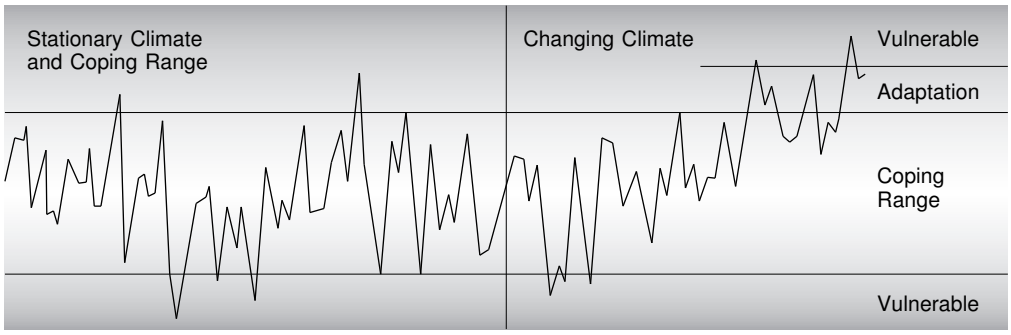

Figure 1. *Adaptation buys time by extending the coping range.* (adapted from Pittock 2005, 73)

It is too late to avoid the effects of global warming. But it is *not* too late to assemble and project strategies and tools to allow us to adapt (Figure 1). To be able to deal with the great challenges of emissions reductions that will be necessary on a global scale to mitigate the worst of the greenhouse changes—while improving or even maintaining our quality of life—will require that we rise above the widely diverse environmental challenges that now will confront local

regions and communities. Change will not be uniform. Some regions will be hotter and drier; some will be wetter. Around the world's coastlines, all habitats will experience rising waters (16 of the world's 19 cities rated as megacities in 2005 were on a coast). Weather events will become more intense and more frequent. And a host of induced plagues will follow on from these climatic disruptions. Our passport to survival will be our capacity to adapt.

A. Barrie Pittock. **Climate Change. Turning Up the Heat.** Collingwood, Vic., Australia: CSIRO Publishing, 2005.

Relevant Trends

Trends initiated by emerging technologies, changing environmental conditions, and evolving social change will have real impact on the situation. Among such trends are:

Population Growth
Population growth continues to soar around the world. Particularly in developing countries, but also in countries with significant immigration (such as the United States), rates of population increase are putting heavy demands on available resources. Although estimates for a final asymptote have decreased, world population is still expected to top 9 billion by 2050. It is now 6.64 billion.

Population Movements
A combination of forces is creating a movement of people from rural to urban environments. In the developing countries, it is the perception that better jobs are in the cities. In the developed countries, it is the renaissance of the city as a cultural center coupled with the progression of societies from agriculture to manufacturing to service to information economies. In 2005 for the first time, the world's population was more urban than rural.

Energy Resource Depletion
World petroleum resources are reaching the point where additions to reserves no longer equal reductions from production. Estimates for final peak production vary from 2005 to a just a few years from now. The world economy, deeply committed to petroleum as fuel resource, must meet its energy needs by other means in the near future.

Diminishing Water Resources
Water supplies are already becoming precious resources in many parts of the world. Today, one-third of the world lives in water-stressed countries; by 2050, two-thirds will be in similar circumstances—including significant parts of the U.S. As regions are strained by greater demand, new efficiencies in water distribution, use, purification and reuse will be mandatory.

Increasing expectations
The growing availability and capabilities of communications such as cellular telephones, satellite and cable TV, and the Internet are providing people with daily knowledge of living conditions, problems, products, threats and services everywhere. As the media create new and faster avenues of communication, they also raise levels of awareness and create expectations that both fuel demand and encourage willingness to change.

Internet Penetration
Computer use and Internet access grow exponentially every year. Information of encyclopedic detail can be obtained more and more easily, and complex, sophisticated processes can be used remotely. Access to high-quality communications and

sophisticated computer tools are increasingly available to individuals and groups anywhere. In the United States, Internet penetration reached 67% in 2005, and some Asian and European countries surpass that.

Emerging Technologies
The pace of technological change continues to accelerate, bringing new science to industrial, institutional and governmental uses at an ever quickening pace. Most notable among many promising fields, major technological innovations can be expected in the new disciplines of molecular nanotechnology, robotics and the biosciences.

New Relationships
Greater public mobility and access to information is changing the nature of association for many individuals and organizations. Organizations that once operated in isolation are now players in a common environment. Sometimes the emerging relationships are competitive, sometimes cooperative, and new forms of relationship can be expected to be created as conditions evolve.

Project Statement

Using Structured Planning methodology, conduct an advanced planning project to develop a portfolio of strategies, processes and system concepts that can be custom-tailored to threats of a hotter/drier environment as they may massively affect a locality or region. The proposal should:
1. treat all concepts as adaptive tools, adaptive to site conditions at implementation, adaptive over time to changing capabilities and conditions.
2. consider the full spectrum of environmental planning from anticipation to preparedness to implementation to restoration.
3. collect and incorporate best practices as they are known to organizations, agencies and planning experts throughout the emerging global warming community.
4. anticipate and plan for networked operational cooperation among affected and spared communities locally, regionally and internationally.
5. seek out and favor concepts that maximize economic, social and/or environmental benefits beyond their primary function to alleviate the effects of global warming.

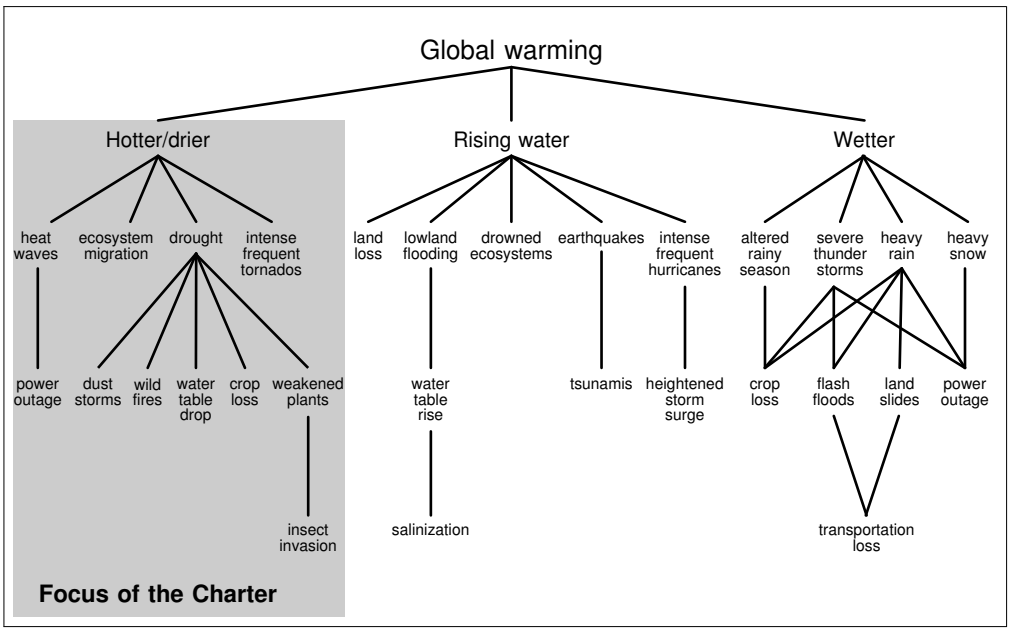

Figure 2. *Some of the local/regional events and consequences to be expected.*

Goals

As general guidelines the project should:

• Explore a full range of possibilities, paying especial attention to the products of emerging technologies successfully advancing through research and development.

• Include ideas for processes, tools, systems and products—including procedures, services, activities, organizational concepts and any relevant relationships among them.

• Explore revolutionary as well as evolutionary ideas.

• Plan for communication processes by means of which other localities, regions and states can learn of and implement successful procedures.

• Consider potential costs and funding thoughtfully; proposals should not incorporate unnecessary frills, but should not ignore perilous outcomes with low risk simply to avoid costs. Treat costs as you would treat those for catastrophe insurance; err on the cautious side and hedge your bet with ancillary economic benefits.

• Conceive the properties and features of the concepts as means to build trust and cooperation between communities. Some will be lucky; others will not; means for the support of others will need to be core tools for all.

Overall, the solution should:

• Assume that the proposal can be acted upon as it is conceived. Do not under-propose on the assumption that a concept might be politically opposed.

• Demonstrate what might be achieved. The value of the proposal is in its ideas, not its certain attainability. Ideas that might not be fully attainable or feasible today may be achieved tomorrow—*if they are known.*

Resources

Resources for the project will be:

Physical:

• The facilities of the Institute of Design, including Room 514 as general meeting space at the beginning of each class session, and 3rd and 5th floors for team activities.
• Computing support from the fifth floor computer facilities.
• Equipment as necessary from ID resources.

Financial:

• None

Human:

• Planning Team

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Margo Horowitz	**Ming-Shan Wu**
Ido Mor	

•Project Advisors:

Charles L. Owen	Distinguished Professor Emeritus
John Pipino	Adjunct Professor

Schedule

The project will be conducted from August 29 to December 8, 2006.

Week		Phase	Activity	Product
1	**Aug 29**	Introduction	Introduce project	
	Sep 1	Project Definition	Develop Issues & Defining Statements	
2	**Sep 5** **Sep 8**		**In-Progress Review**	Issues DefStates 1
3	**Sep 12**		Develop Modes and Activities of Function Structure	
	Sep 15		**In-Progress Review**	DefStates 2 Fn Struc 1
4	**Sep 19**	Information Development *Action Analysis*	Generate Functions, Design Factors and Solution Elements	
	Sep 22			
5	**Sep 26** **Sep 29**			
6	**Oct 3**		**In-Progress Review**	DefStates cmplete Fn Struc 2 DesFacs 1 SolnEls 1
	Oct 6	Information Development *Action Analysis 2*	Complete Functions, Design Factors and Solution Elements	
7	**Oct 10** **Oct 13**			Fn Struc complete DesFacs complete SolnEls complete
8	**Oct 17**	Information Structuring *Interaction*	Score Soln Elements vs Functions	
	Oct 20	*Structuring*		RELATN input

Week		Phase	Activity	Product
9	**Oct 24** **Oct 27**	Concept Development	Means/Ends Analysis	Inf Structure
10	**Oct 31** **Nov 3**		Ends/Means Synthesis	Inf Struc named
11	**Nov 7**		**In-progress Review**	Initial System Elements
	Nov 10			
12	**Nov 14**		**Presentation**	Final SysEls
	Nov 17	Communication	Refine final SysEls; write report; complete illustrations	
13	**Nov 21** **Nov 24**	***Thanksgiving*** Holiday		
14	**Nov 28** **Dec 1**			
15	**Dec 5** **Dec 8**		**Final Presentation**	Illustrated Report

Methodology

The project will be conducted using Structured Planning (See articles on the subject by Charles Owen at ***http://www.id.iit.edu*** under the *Publications* section of *Research & Ideas*:
1. *Context for Creativity,* 1991.
2. *A Critical Role for Design Technology,* 1993.
3. *Design, Advanced Planning and Product Development,* 1998.
4. *Structured Planning,* 2001.

Also, see the book by Charles L. Owen available at the Institute of Design: **Structured Planning. Advanced Planning for Business, Institutions and Government. *Notes on the Process with Summary Pages and Examples,*** 2006).

Issues

Consider the following topics as initial issues to be investigated. Supplement them with additional issues as information is developed during the first phase of the project.

Technology. What approach should be taken toward the use of emerging technologies and advanced science and engineering concepts?

Adaptivity. How should elements of the system be prepared to respond to evolving environmental threats and emerging technological capabilities?

Networking. What provision should be made toward partnering with other cities, regions, suppliers of funding, technology, goods, etc.?

Time of Introduction. For what time frame should the portfolio's system of tools be planned for implementation?

Means of Introduction. How should the portfolio be introduced to facilitate acceptance and implementation?

Public/Private Sector Relationships . How should the portfolio be positioned with respect to authority/responsibility for implementation and operation?

Concept Communication. How should the idea of the portfolio and its individual strategies, processes and system concepts be brought to public and institutional attention?

Cost. How should expected costs of system elements be approached?

Disaster Contexts. What expectations should be set for extreme conditions to be withstood?

Self-Sufficiency. What level of self-sufficiency should be sought for communities and other political entities?

Defining Statement

ISSUE TOPIC

Time of Introduction

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ido Mor

CONTRIBUTORS

QUESTION AT ISSUE

For what time frame should the portfolio's system of tools be planned for implementation?

POSITION

constraint Proposed solutions must be fully phased into implementation in the next 50 years (by 2056). Any phases ready for implementation immediately will only function to alleviate the problems of rising temperatures.

SOURCE/S

Data From Space, Oceans Validate Global Warming Timeline. In Washington Post, August 25, 2005

In Scientific American, August 2006

ALTERNATE POSITIONS

directive It should be considered that several studies exist which interject doubt as to the reliability of the computer modeling methods that have proposed the 50 year time frame.

BACKGROUND AND ARGUMENTS

Several computer generated models (sited) propose global warming to cause a 10-degree temperature leap in the next 50 years. Most convincing was an international effort called ARGO, led by NASA researchers, which began in 2000. The study collected data from 1,800 technology-packed floaters that were strategically deployed in seas worldwide. The floaters measured fluctuations in ocean temperatures and changes in sea levels.

Having calculated acquired data in conjunction with several quantitative computer models charting rising Carbon-Dioxide emission levels, NASA researchers brought certainty to the earlier proposed 50 year projections. It is important to note that the 50 year end of the spectrum is an already grave scenario. This model serves to punctuate the urgency of implementing immediate measures to alleviate Carbon-Dioxide emissions and refrain from further depletion of the ozone.

While some doubt the legitimacy of NASA's research predictions for future temperature increases, there is no question as to the data that has already been gathered, demonstrating temperature rises that have occurred thus far. Focusing strictly on the implications of documented rises already proves the connection between temperature rises and desertification, as well as health implications which should be addressed immediately.

With ARGO's prediction of a 10-degree temperature increase in the coming decades, a wider range of effects is already impacting agricultural production around the world. Arid regions are further desertifying, leading to the migration of tens of thousands of migrants each year, in search of new water sources to support their agricultural economies and sustain their socio-economic structures.

Aside from the migrations shifts expected due to temperature rises, there are many health implications associated as well. There are signs to support that shorter winters are improving the likelihood of many disease-carrying animals and insects to survive into the fall, bringing with them a rise in the number of affected humans.

In considering whether or not to address the 50-year timeline as well-justified prediction, we propose that it is more important to emphasize the need to address already occurring effects of global warming, regardless of their cause. The longer we wait to implement changes and initiatives, the more difficult and costly it will be to rectify the situation.

Defining Statement

ISSUE TOPIC

Environmental Refugees

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ido Mor

QUESTION AT ISSUE
How will the growing number of environmental refugees be addressed as the situation worsens?

CONTRIBUTORS

POSITION

constraint Environmental refugees must be accounted for as normal refugees (of war or of natural disaster).

SOURCE/S

Environmental Asylum. In Environment, March 2006

The looming environmental refugee crisis. In Ecologist , March 1999

Creeping desert casts shadow over Mexico. In Forum for Applied Research and Public Policy, Fall 1996

ALTERNATE POSITIONS

constraint Environmental refugees must be provided with temporary safeguards and provisions but must return and re-inhabit their homeland.

directive Environmental refugees ought not to be given equal status as victims of civil unrest, war or natural disaster. It would be incredibly subjective to define the nature of their status.

BACKGROUND AND ARGUMENTS

The impact of climate change around the world is set to create millions upon millions of new refugees, as whole regions become uninhabitable through food and water shortages. As the planet warms, food and water grow scarcer. In 1998, the Hadley Centre for Climate Prediction and Research forecast major decreases in crop yields by 2050. These would above all affect the tropical countries of South America, Russia and western Africa. As for water scarcity, the Hadley Centre forecasts that by 2050, about 170 million people will suffer severe stress: their countries will be using over 40 per cent of their water resources. Global warming may also endanger the monsoon, with effects much greater than those of drought alone particularly in India given that 70 percent of India's rainfall comes from the monsoon. Indeed, the Asian Pacific region as a whole, which has half the world's population, likewise depends on the monsoon.

In the last 5 years, Red Cross research teams found that more people are displaced by environmental disasters than by war, amounting to 58% of the total world refugee population. Climate change, at a conservative estimate, will increase the number of environmental refugees six-fold over the next fifty years: from 25 million to 150 million.

Aside from the shock in the sheer growing masses of displaced people, it is critical to recognize that with global warming develops a new kind of refugee. This is the environmental refugee are not victim to a dramatic occurrence such as tsunamis, earthquakes or hurricanes, but to the seemingly slow transformation of landscapes which become rendered obsolete by climate change. The land of these refugees can no longer sustain their communities with food and water, and so they are faced with the reality of relocation.

Unlike victims of over-night natural disasters, those affected by a desertification do not get media coverage to expose their plight. In effect they do not receive international aid from donations and furthermore are not eligible for U.N. assistance since they are not victims of civil or political unrest.

As example of a pre-emptive plan, the Pacific island state of Tuvalu has struck an agreement with New Zealand to accept its 11,600 citizens in the event that rising sea levels swamp the country.

Defining Statement

ISSUE TOPIC
Health Concerns

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ido Mor

CONTRIBUTORS

QUESTION AT ISSUE

How should resources be allocated to account for changing threats to public health?

POSITION

objective Resources should be allocated to further understand severity of potential threats. Appropriate medicinal stocks should be maintained and advancements in medicine developed.

SOURCE/S

Climate Change Drives Disease To New Territory; Viruses Moving North to Areas Unprepared for Them, Experts Say. In Washington Post, May 5, 2006

Lessons from the 1918 Flu. In Time 166, no. 16 (October 17, 2005): p. 96.

ALTERNATE POSITIONS

objective Though many computer generated predictions have been generated, global warming's implications on health are still unknown. Resources would be better allocated toward more proven threats.

BACKGROUND AND ARGUMENTS

Regardless of whether or not there is sufficient proof as to humans' role in the threat of global warming, one fact that cannot be refuted is that the earth is becoming a warmer and warmer place to live. Rising heat levels are causing conditions such as shorter winters, which in turn make it possible for disease and virus carrying organisms to survive and spread into broader regions, and in larger quantities. It is predicted that with the broadening of impact of these diseases, organisms will develop greater immunities to methods of combat. As epidemics spread, failures of the public health system will quickly be exposed.

We must begin immediately to address the issue of rising epidemics as a result of global warming and develop strategies and infrastructure to cope with the problem while it is still in the horizon. Once present, it will be exponentially difficult to deal with resulting epidemics. The impact would tax our resources heavily and magnify the quantity of affected individuals.

Even the mildest virus would slam the economy harder now than at any time in the past. That's because businesses and hospitals have improved efficiency to minimize slack. When an individual has a greater role in the function of a system, there is a greater impact on that system should that individual be absent. This can have a butterfly affect, for example in the manufacturing world, if a shipping department of one factory can't get needed parts to another. Since hospitals (as businesses) are not immune from this phenomenon, it also means a surge of patients will quite easily overwhelm an already understaffed division. Massive disruptions will result.

The 1918 flu pandemic killed 675,000 Americans at a time when the U.S. population was 100 million. False reassurances from the government and newspapers added to the death rate. They also destroyed trust in authority, as Americans quickly realized they were being lied to. The result: society began to break apart.

As evicence of the contrary, San Francisco was the only major city in which the local leadership told the truth about the disease. It organized emergency hospitals, volunteer ambulance drivers, soup kitchens and the like in advance. There, although fear certainly showed itself, it did not paralyze. If we prepare well enough, we won't need heroes; we'll just need people doing their jobs.

Defining Statement

ISSUE TOPIC

Public/Private Sector Relationships

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ido Mor

CONTRIBUTORS

SOURCE/S

Cities, States Aren't Waiting For U.S. Action on Climate. In Washington Post, August 11, 2006

QUESTION AT ISSUE

How should the portfolio be positioned with respect to authority/responsibility for implementation and operation?

POSITION

objective Successful implementation of solutions rely on an effort between the public and private sector. The public sector should enforce a path towards full sustainability, creating a controlled environment wherein private sector will perform toward goals.

ALTERNATE POSITIONS

constraint Implementations of solutions must be strictly mandated by public sector. This will assure full implementation in defined stages, and strict consequences for failure to do so.

directive Public sector ought to have no involvement in the mandating of solution development and implementation. The private sector ought to function freely to devise solutions as it deems appropriate.

BACKGROUND AND ARGUMENTS

Global warming is a rising issue in public debate. While many agree that it is an inevitably urgent matter, opinions are passionately split as to man's role in causing ozone depletion. Having said this, it is scientifically proven that a direct relationship exists, between carbon-dioxide emissions and advancement of ozone depletion. While extensive data has been composed to demonstrate this, little has been altered with regards to industry practice in response. This is partially due to the fact that current measures of economic growth fail to consider long-term implications of continued global warming. In turn, costly implementation of reduced emissions technologies result in greater up-front production costs which make companies on unbounded playing fields either less competitive, or less profitable. In the current competitive arena of global economy, implementation of non-mandated procedures is unjustifiable to investors when competitors are not bound in turn, to implement the same measures in their organizations.

In an effort to reduce carbon-dioxide emissions, we must begin by addressing the largest producers of CO2 emissions. State and federal governments must join municipalities in leveling the competitive playing fields, effectively promoting conditions for the implementation of innovative solutions. While these may prove costly on the front-end, the alternatives will bring much greater instability to a non-sustainable market. Ultimately, as William McDonough points out, it will negatively impact the abilities of future generations to continue living as we do today.

It is true that private initiatives, such as the X Prize Foundation, have resulted in "Radical breakthroughs for the benefit of humanity," as their tag-line states. Unfortunately there is little to show that the private sector recognizes the environment as a sufficiently valuable market. The problem lays in that the speed of integration for environmental change is quite slow in comparison to the massive growth offered to investors by promising start-ups venturing towards overnight success. The market has proven this over the past decades.

Growing frustration by city and state-level governing bodies over lack of federal initiative has led 10 Northeast U.S. states to mandate ceiling levels for carbon-dioxide and other greenhouse gasses by the year 2019. It is projected that this will effectively result in a 10% decrease of emissions. Other states are considering trading emissions credits overseas with such countries as the United Kingdom. To accentuate the urgency of coming to a unified vision, current federal legislation in the US is challenging that which state-level governments have already managed to implement, saying it may lead to an unbalanced economy. It is time to redefine economic value.

Defining Statement

ISSUE TOPIC

Concept Communication

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Myongwon Suh

QUESTION AT ISSUE
How should the idea of the portfolio and its individual strategies, processes and system concepts be brought/adapted to public and institutional attention?

CONTRIBUTORS

POSITION

constraint Characteristics of the portfolio, the adopters' life cycle, and the social environment must be sustainable and compelling.

SOURCE/S

'The Innovator's Dilemma', by Clayton M. Christensen.

'The Innovator's Solution, creating and sustaining successful Growth', Clayton M. Christensen.

'The Technology Management Handbook', by Richard C. Dorf.

ALTERNATE POSITIONS

directive In order the idea of the portfolio to be brought/adapted to public and institutional attention, characteristics of the portfolio, characteristics of the adopters' life cycle, and characteristics of the social environment must first be defined to be sustainable and compelling.

BACKGROUND AND ARGUMENTS

Turning an innovative idea (for living in a hotter/drier world) into a new product or process with a successful consequences requires getting public and institutional attention to use the proposed portfolio. The more important question to ask is not only how the idea of the portfolio should be brought to public or institutional attention, but also how it can attract and compel them to adopt and accept the innovative idea as a dominant design, especially after a technological or methodological innovation and subsequent era of ferment in the crisis of hotter/drier weather change.

This challenge here is a perspective of the underlying process, the 'diffusion of innovations (the portfolios)' – "focuses on how new technologies spread through a population of potential adopters, on the one hand, it describes the process of getting new ideas adopted and, on the other, the process of adopting new ideas".

According to Richard C. Dorf, a professor at the University of California known as an instructor who is highly concerned with innovation's application to social and economic needs, in understanding how the idea of portfolio can be discussed to public and institutions, the three predominant trajectories must be carefully defined to be sustainable and compelling: Characteristics of the portfolio, Characteristics of the adopters (the creation (product/service/ policy/process)'s life cycle (from innovators, early adopters, early majority, late majority, to laggards), characteristics of the social environment (communication channels, social system: decision environments, opinion leaders). Therefore, for the concept communication, it is necessarily to nd users' needs in the context of social/cultural trends analysis.

Defining Statement

ISSUE TOPIC
Public Services

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
CJ Chou

CONTRIBUTORS

QUESTION AT ISSUE

What new public services are necessary for residents adapting to hotter/drier impacts?

POSITION

objective Temporary shelter with sunshade, water supply and communication access must be built everywhere in public.

SOURCE/S

Study predicts a much hotter, drier California
http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/08/01/WARMING.TMP

Desert Survival Primer
http://www.desertusa.com/mag99/mar/stories/desert-sur.html

American Red Cross
http://www.redcross.org/services/prepare/0,1082,0_243_,00.html

ALTERNATE POSITIONS

objective Overground public services should be revised as underground ones with urban renewal planning.

objective Outdoor public services should be revised as indoor ones with urban renewal planning.

BACKGROUND AND ARGUMENTS

Hotter/drier weather would result in: (1) The risk of death increases from dehydration, heat stroke, heart attacks, stroke and respiratory distress. Under the most extreme scenario, heat-related deaths could increase four or six times. (2) The snowpack, the top source of fresh drinking water, could nearly disappear. That would pose a challenge to water agencies that now rely on slowly melting snow to replenish reservoirs. (3) Power demand could up as much as 20 percent, but hydropower supplies would drop.

According to American Red Cross, if a heat wave is predicted or happening, people must (1) slow down and avoid strenuous activity. (2) Stay indoors out of the sunshine as much as possible. (3) Wear lightweight, light-colored clothing that will reflect away some of the sun's energy. (4) Drink plenty of water regularly and often. (5) Drink plenty of fluids even if you do not feel thirsty.

Among the three positions, public shelter is the best choice because it is easy, inexpensive and fast to build on anywhere in public. Although an underground or indoor city can provide absolute safety for its residents, its construction must cost great amount of money and time. It is probably not able to solve the present danger in a hotter/drier world.

Thus, against hotter/drier impacts, public services should provide shelter with water supply and communication access for emergency. By staying in the shade or limiting activity to cooler area, taking a good drink and hastening rescue if necessary, chances for preventing danger increase greatly. In any city, community or other political entity, public shelter could be the main consideration for safety.

Defining Statement

ISSUE TOPIC
Cost

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
CJ Chou

QUESTION AT ISSUE

How should expected costs of system elements be approached?

CONTRIBUTORS

POSITION

objective — The system costs should be direct costs paid by polluters, violators, consumers and anyone making the world hotter/drier.

SOURCE/S

Get Ready
As Hurricanes Hit, Think Global Warming
http://www.americanprogress.org/site/pp.asp?c=biJRJ8OVF&b=1723963

Diamond, Jaret Collapse. How societies Choose to Fail or Succeed. New York: Penguin Group Inc., 2005.

Team deliberations

ALTERNATE POSITIONS

objective — The system costs should be indirect costs in forms of public fund, budget or tax paid by all residents.

BACKGROUND AND ARGUMENTS

Climate change is a critical public issue that should be addressed for preserving and enhancing public safety. The government should invest an emergency fund necessary for security infrastructure needed to meet new and growing threats to both the national and community level from climate change. As bearing the costs of increased risks to security and economic stability, those costs must be shared equitably across society to enhance the common good, not pass on the expense as a burdensome, unfunded mandate to every community or other political entities.

To define, direct cost is a cost that can be directly traced to producing specific goods or services. According to Collapse written by Jared Diamond, people would be more concerned with environmental conservation if they know they can help. 80% of consumers claim that they would prefer to buy products of environmentally clean provenance if given the choice. In this way, their payment will contribute to support sustainable development and policy. Likewise, consumers buying products or services resulting hotter/drier have to be charged more and be noticed how much more they need to pay.

If direct cost is strictly applied, public will pay much less for environmental damage done by few polluters. Of course, those potential polluters have to invest an emergency fund before polluting. On the contrary, if indirect cost is applied, most public possibly still suppose they cannot do anything for environmental protection. It is because they do not know how government fairly and reasonably uses their tax for environmental issues. What worse is that the polluters will not be directly punished. They may keep polluting until they make no profit.

In the case of strategies for living in a hotter/drier world, the system costs could be directly charged from those who make the world hotter/drier. No matter they or the products or service they bought are supposed to emit CO2, heat, waste or any kind of pollutant damaging the world.

Defining Statement

ISSUE TOPIC

Disaster Contexts

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ming-Shan Wu

CONTRIBUTORS

QUESTION AT ISSUE

What expectations should be set for extreme conditions to be withstood?

POSITION

constraint The approach must offer effective disaster management to mitigate the impact of the disaster.

SOURCE/S

Government initiatives in disaster management
Geetika Rani, merinews
27 July 2006, Thursday
http://www.merinews.com/catFull.jsp?articleID=123326&catID=2&category=Nation&rtFlg=rtFlg

An Intelligent decision support system for flood management: A spatial system dynamics approach
by Ahmad, Sajjad, Ph.D., The University of Western Ontario(Canada),2002,311

ALTERNATE POSITIONS

objective The approach should have the predictability to estimate the scale of hotter and drier disaster to disseminate the plan of survival and recovery.

BACKGROUND AND ARGUMENTS

The impact of global warming changes the climate conditions in different areas. The rising of the global temperature and variable regional climate may lead to both natural disaster and man-made disaster. The damage in terms of human suffering, loss of life, agriculture productivity and economic losses has been astronomical in the last decade.

For example, India has suffered multiple natural disaster, such as floods, earthquake, drought, landslides, cyclone which is due to various factors. The India government has set up the National Disaster Framework covering institutional mechanisms, disaster prevention strategy, early warning system, disaster mitigation, preparedness and response and human resource development, and the National Committee on Disaster Management to suggest necessary institutional and legislative measures necessary for an efficient and long-term strategy to manage natural disasters. Another High-Powered Committee on disaster management plans was constituted in 1999 to prepare comprehensive model plans for management of disasters at the national, state and district levels.

Therefore, to withstand the disaster in extreme conditions, an approach of disaster management is needed. Disaster management is the discipline dealing with and avoiding risks. It is a discipline that involves preparing, supporting, and rebuilding society when natural or man-made disasters occur. The process of emergency management involves four phases: mitigation, preparedness, response, and recovery.

Effective emergency management relies on thorough integration of emergency plans at all levels of government and non-government involvement. Activities at each level (individual, group, community) affect the other levels. To estimate the scale of the damage with system approach is to help the decision maker declare different scale of activities in every level and reduce the damage.

Defining Statement

ISSUE TOPIC
Education

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Margo Horowitz

QUESTION AT ISSUE

What approach can use education effectively to inform public of living in a hotter and drier environment?

CONTRIBUTORS

POSITION

constraint Education for sustainable development and living in a hotter/drier world must make explicit the particular values that are to be taught to all parties.

SOURCE/S

Education for Sustainable Development:
The Role of the Humanities and Social Sciences.

http://www.ulsf.org/pub_declaration_curvol71.htm

ALTERNATE POSITIONS

constraint All scientific evidence should be introduced at the governmental level and be passed to the public sector by means of organizations.

BACKGROUND AND ARGUMENTS

Educating the population about living in a hotter/drier world must be clear and basic in order to reach the general public. Comprehension and good communication is the key to successfully educating people on the issues of global warming and the ways to live with the current conditions. All educational outlets need to be consistent in their teachings. Explicit values and expectations need to be made clear before false messages are conveyed.

Sustainability is fundamentally a moral and political question. In the article, Education for Sustainable Development, the author states, "Many corporations are embracing themes related to sustainable development in order to demonstrate that they are good corporate citizens; at the other end of the spectrum is a radical social ecology that sees capitalism as inherently unsustainable." Therefore, education for sustainable development must first acknowledge the nature of the concept, and then make clear the particular values that are to be taught.

Defining Statement

ISSUE TOPIC
Emission Control

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
CJ Chou

CONTRIBUTORS

QUESTION AT ISSUE

How can we stop dangerous emissions which are making the world hotter and drier?

POSITION

objective The strategies should propose a constraint limiting how much heat/CO2 each building/vehicle emits.

SOURCE/S

Study predicts a much hotter, drier California
http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/08/01/WARMING.TMP

An Inconvenient Truth
http://www.climatecrisis.net/takeaction/whatyoucando/

Warming to the Inconvenient Facts
http://www.washingtonpost.com/wp-dyn/content/article/2006/07/21/AR2006072101376.html

ALTERNATE POSITIONS

objective The system should propose a constraint limiting how much heat/CO2 each object emits.

objective The system should propose a constraint limiting how much heat/CO2 an individual produces.

BACKGROUND AND ARGUMENTS

The average American generates about 15,000 pounds of carbon dioxide every year from personal transportation, home energy use and from the energy used to produce all of the products and services we consume. Most emissions from homes are from the fossil fuels burned to generate electricity, heat and CO2. If emissions continue unabated, there could be up to 100 more days a year when temperatures hit 95 degrees or above. By 2100, there will be a drop in water supply and up to six times more heat-related deaths in major urban centers. Under the most extreme scenario, heat-related deaths could increase four or six times.

Actions to reduce hotter/drier impacts can extend beyond how individuals reduce their own emissions. For example, by using energy more efficiently at home, everyone can reduce emissions and lower energy bills by more than 30%. Governments have also started to limit emission. For example, the United States has fuel-efficiency standards for cars and trucks, which produce nearly one-third of our emissions; Japan's requirements are twice as stringent, and even China's are tougher. Germany, Britain and the Netherlands have pledged reductions of 50 percent, 60 percent and 80 percent, respectively.

Among the three positions, limiting building/vehicle emission is more practicable because building or vehicle system itself could be a unit for controlling and recycling heat/CO2. It also indirectly encourage people to think about sustainable energy. On the contrary, either limiting object or individual emission seems to be very difficult or expensive.

In fact, when confronting hotter/drier impacts, people in one building showing empathy and solidarity have the power to make a difference. With government's policy encouraging emission reduction and technology support, small changes to daily routine can add up to big changes in helping to prevent hotter/drier jeopardy.

Defining Statement

ISSUE TOPIC

External Forces

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Myongwon Suh

CONTRIBUTORS

SOURCE/S

'Competitive Strategy', by Michael Porter, 'The Innovator's Solution' creating and sustaining successful growth, by Clayton M. Christensen.

'Business Models: ,a strategic management approach', by Allan Afuah.

QUESTION AT ISSUE

How should the idea of the portfolio should be launched in the dynamics of industry and market?

POSITION

constraint Michael Porter's 5 forces must be analyzed and implemented on the idea of the portfolio for launching in the dynamics of industry from this project.

ALTERNATE POSITIONS

objective Its competitive advantages and its hard and soft benefits for users should be built on the idea of portfolio.

BACKGROUND AND ARGUMENTS

When the idea of portfolio, whether it is product or service or policy, leaves o from the innovator's hand and come out to the industry, without external forces added into the outcome it's impossible to survive in the dynamics of industry, because there exist the forces driving industry competition from other processors.

Given the role that competitive forces play in a innovator's ability to appropriate the value that it creates for users, an important question is, Can the creators (hotter/drier group) of the idea of portfolio influence the competitive forces that impinge on it? The answer is yes. The activities that the creators chooses to perform, when it performs them, and how it performs them, as well as the resources that allow the creators to perform these 3 activities, can go a long way toward determining its position vis-à-vis its suppliers, users/customers, potential new entrants, substitutes, complementors, and rivals.

According to Michael Porter of the Harvard Business School, the world's pre-eminent strategy theorist, there must be 5 external forces surrounding the innovations: Bargaining power of suppliers, Threats of substitute products or service, Bargaining power of buyers, Threat of new entrants, and Rivalry among existing creator/organization/firms. The creator's power over a coopetitor is extent to which the creator is dependent on the firm. In the creators-supplier relationship, for example, a supplier's bargaining power is the extent to which the supplier can effectively determine the price-cost relationship between itself and the creators. Suppliers with considerable power can charge higher prices and ship lower-quality supplies. Higher prices for suppliers mean higher costs for creators and therefore lower profitability. Therefore, the 5 force must be analyzed, implemented not only to preparing to the idea of portfolio before it actually leaves o from innovator's hand, but also to derive investor's hand from pocket on this project.

Defining Statement

ISSUE TOPIC

Means of Introduction

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Margo Horowitz

CONTRIBUTORS

QUESTION AT ISSUE

How should the portfolio be positioned with respect to authority/ responsibility for implementation and operation?

POSITION

objective Introduction of proposed solutions will rely to great extent on revised social policy.

SOURCE/S

Cities, States Aren't Waiting For U.S. Action on Climate; [FINAL Edition] Juliet Eilperin - Washington Post Staff Writer. The Washington Post

http://proquest.umi.com/pqdweb?did=1092653841&sid=4&Fmt=3&clientId=9561&RQT=309&VName=PQD

ALTERNATE POSITIONS

directive Encourage Federal government to work with state and local officials to form partnerships to implement comprehensive climate change strategies.

BACKGROUND AND ARGUMENTS

With Washington lawmakers deadlocked on how best to curb global warming, state and local officials across the country are adopting ambitious policies and forming international alliances aimed at reducing greenhouse gases. Some local officials said they are pushing ahead with plans because the Bush administration, which has promoted cleaner technology but opposes mandatory curbs on greenhouse gas emissions, has failed to adequately address the problem.

In introducing global warming to governmental body, clear goals must be agreed upon. While, debate is often embedded in scientific terms and with appeals to high universal principals, the positions of the different partisans to the debate are better understood in terms of attainable goals.

Organizations at all levels need to be educated. Introductions must be most powerful to those most indirectly affected.

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ming-Shan Wu

CONTRIBUTORS

QUESTION AT ISSUE

In what approach can use the nature resource effectively in hotter and drier environment?

POSITION

objective The strategies should propose an approach of conservation.

SOURCE/S

About Natural Resource
http://en.wikipedia.org/wiki/Natural_resource

Global Warming – Impacts
http://yosemite.epa.gov/oar/globalwarming.nsf/content/Impacts.html

ALTERNATE POSITIONS

objective The strategies should present new processes or activities to ease the shortage of natural resource.

BACKGROUND AND ARGUMENTS

Global warming is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. The climate change causes the threat of natural disasters, resource and energy shortage, geographical and planetary change, economy collapse and collapse of ecosystem. It is easy to understand the means of "temperature increases" will come to more dry periods and longer summer than before. And the threat of drought, the climate change to hotter and drier condition will make people face the issue of the shortage of natural resource. In the history of Civilization, people fight for natural resource and live depend on it.

Natural resources are often classified into renewable and non-renewable resources. Renewable resources are generally living resources (fish, coffee, and forests, for example), which can restock (renew) themselves if they are not overharvested. Non-living renewable natural resources include soil, as well as water, wind, tides and solar radiation — compare with renewable energy. A nation's natural resources often determine its wealth and status in the world economic system, by determining its political influence. Climate change and overuse of the natural resource made the governments face the issue of limited and shortage of natural resource by develop policy related energy. Conservation is one way to make sure we have enough energy in the future.

Owing to the technology improvements, fast information gathering and the awareness of worldwide disaster, more and more world organization make protocol or laws that may help slow down the speed of global warming and build up a knowledge platform to transfer technology and other resources.

Therefore, a well- planned natural resources policies and effective actions to prevent the shortage of resource may help regional people adapt to the vary climate and find more sustainable solutions to create higher value and profits to mankind.

Defining Statement

ISSUE TOPIC
Networking

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Myongwon Suh

QUESTION AT ISSUE

What provision should be made toward partnering with other cities, regions, suppliers of funding, technology, goods, etc?

CONTRIBUTORS

POSITION

constraint Solutions must be predictive, anticipating all possible environmental changes and threats.

SOURCE/S

EPA Global Warming Impacts
http://yosemite.epa.gov/OAR/globalwarming.nsf/content/Impacts.html

BBC Weather, Global Warming - What Can We Do? - Helen Willetts
http://www.bbc.co.uk/weather/features/global_warming2.shtml

ALTERNATE POSITIONS

objective Solutions should focus on the most high risk areas which will be affected first and most severely.

BACKGROUND AND ARGUMENTS

Temperatures are rapidly increasing, in reaction to global warming. As rising temperatures are becoming more of a threat, making clear and logical predictions about the future climate is critical. It is necessary to address calculate the rate at which changes have take place up to present, as well as anticipating future change.

It is predicted that by the summer of 2050 temperatures will have risen by around 2 degrees or more. Just a small rise in temperature will result in more hot days in cities (temperatures over 30 C). Rising global temperatures are expected to raise sea level, and change precipitation and other local climate conditions. Changing regional climate could alter forests, crop yields, and water supplies. It could also affect human health, animals, and many types of ecosystems. Deserts may expand into existing rangelands, and features of some of our National Parks may be permanently altered. There is likely to be an overall trend toward increased precipitation and evaporation, more intense rainstorms, and drier soils.

As situations become worse and as temperatures rise, uncertainties in future predictions arise due to imperfect estimates of future emissions of greenhouse gases, which in turn depend on population growth, energy demand, and economic factors. In order to develop a successful solution, our predictions must be realistic and accurate as possible.

Defining Statement

ISSUE TOPIC

Self-Sufficiency

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
CJ Chou

CONTRIBUTORS
Margo Horowitz

QUESTION AT ISSUE

What level of self-sufficiency should be sought for communities and other political entities?

POSITION

objective Self-sufficiency should regard to food and energy supply for daily use in communities and other political entities.

SOURCE/S

U.S. Environmental Protection Agency
http://yosemite.epa.gov/OAR/globalwarming.nsf/content/ImpactsAgriculture.html

Organic Pathways
http://www.organicpathways.co.nz/community/story/427.html

Self-Sufficient Living
http://www.solarhaven.org/SolarHavenMainPage.htm

ALTERNATE POSITIONS

constraint Self-sufficiency should only relate to energy supply for daily use in communities and other political entities.

directive Self-sufficiency in regards to food, energy and man power should be applied in communities and other political entities.

BACKGROUND AND ARGUMENTS

Global climate change will clearly impact agriculture production, exports, imports and market prices. Many studies have examined the likely impacts of climate change on agriculture both in the United States and abroad over the last couple of decades. Developing countries are likely to have considerably more difficulty adapting to climate change due to many factors, such as less developed technology and less available capital.

Self-sufficiency is a wealth of existing knowledge that could provide food security for all and significantly mitigate the impacts resulted from global warming. In a self-sufficiency autonomy with sustainable agriculture, there is no fertilizers, no pesticides and much less CO2 emission. Sustainable farms support more wildlife and produce organic foods indeed better for people. Besides, buying food in local farmers' markets generates twice as much for the local economy than buying food in supermarkets chains. Two recent studies reveal that shifting to local sustainable farming would yield more food for the world's hungry.

In addition to food, self-sufficiency could also regard to several aspects in daily life, such as sustainable energy, building and facility maintenance, education, public welfare, etc. It is reasonable that a community or other political entity with sufficient manpower could produce most daily necessities for their own use. In this way, people can make living by providing different products or services to each other in a local economy.

With solar electric panel and wind generator, sustainable energy is applicable in a hotter/drier world. Likewise, a community or other political entity could also adopt sustainable farming if there is sufficient manpower, rain and land (unavailable in major cities). However, for complete self-sufficiency, much more manpower qualified to a variety of positions are needed. Because of the current global economy has developed for long, there must be a great impact if shifting to completely local self-sufficient economy.

Self-sufficiency in daily necessities such as food and energy is possible with existing technology support. Government, industry and residents living in a hotter/drier world should be concerned with it.

Defining Statement

ISSUE TOPIC
Technology

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Myongwon Suh

QUESTION AT ISSUE
What approach should be taken toward the use of emerging technologies and advanced science and engineering concepts?

CONTRIBUTORS

POSITION

constraint The approach must provide communities the same services but in new formats that use less energy and produce less waste by using existing technologies.

SOURCE/S

U.S. Climate Technology Program, 'Research and current Activities', by George. W. Bush Administration

'The Technology Management Handbook', by Richard C. Dorf.

ALTERNATE POSITIONS

directive The project ought to continuously develop the new revolutionary technologies in order to prevent future damages.

BACKGROUND AND ARGUMENTS

In recent studies 2005, by a team of Oxford University scientists report a significantly hot range of possibilities: 2 to 11 C (3.6 to 19.8 F). However, as research continues, there is a growing realization that existing technologies, even with substantial refinements, cannot meet the world's continuously increasing demand for energy and achieve the eventual goal of stabilizing greenhouse gas concentrations in the atmosphere.

For the sake of long-term strategic approach, doing so will require lower or zero-emission technologies that will fundamentally transform current energy system by finding the new revolutionary technologies in order to prevent future damages. However, according to U.S. Climate Technology Program, written by Bush administration, the substitute technology already exists to stabilize global warming, such as carbon sequestration, hydrogen, bioenergy, nuclear fission and fusion, and many other revolutionary technologies.

Then, a remained question put us on a path to finding how to implement these existing technology's adaptation into the communities' daily uses, rather than spending time on inventing revolutionary technologies cause less future damages. Therefore, the approach should be taken toward the use of emerging technologies and advanced science and engineering concepts must be aligned with following goals: providing the communities the same daily uses of services but in new applicational formats with existing technologies that cause less energy consumed and less waste produced to ensure secure, affordable, and clean future and a healthy planet for future generations.

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ming-Shan Wu

CONTRIBUTORS

QUESTION AT ISSUE
How could the system share the medical resource for preventing and controlling the disease that caused by the hotter and drier climate?

POSITION

constraint The system must offer effective and safe environmental medicine.

SOURCE/S

Global Climate Change and Infectious Diseases
http://www.cdc.gov/ncidod/EID/vol4no3/colwell.htm

Climate Change and Health: Need for Expanded Scope of Occupational and Environmental Medicine by Jonathan A. Patz, MD, MPH
http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsPatz_health.html

ALTERNATE POSITIONS

objective The approach should declare the standard control process of infectious diseases.

objective The system should build a center to teach people the knowledge of disease control and prevention.

objective The government policy should regulate the social responsibility of pharmacy industry.

BACKGROUND AND ARGUMENTS

Under the conditions of global warming, direct hazards to human health may become significant public health problems. The most direct effect of global warming would be the impacts of hotter temperatures themselves. Extreme temperatures can directly cause the loss of life.

Higher air temperatures also increase the concentration of ozone at ground level. Besides, warm temperatures can increase air and water pollution, which in turn harm human health.

Global warming may also increase the risk of some infectious diseases, particularly those diseases that only appear in warm areas. Diseases that are spread by mosquitoes and other insects could become more prevalent if warmer temperatures enabled those insects to become established farther north; such “vector-borne” diseases include malaria, dengue fever, yellow fever, and encephalitis.

Many of the impacts of climate change on health could be avoided through the maintenance of strong public health programs to monitor, quarantine, and treat the spread of infectious diseases and respond to other health emergencies as they occur.

In conclusion, the system should develop strategies that seek to promote health and quality of life by preventing and controlling disease, injury, and disability. And the disease control and prevention system should concern about regional climate changes, ways of the disease transmission that could need high level worldwide policy and information and technology working platform.

Defining Statement

ISSUE TOPIC

Regional Ecosystem Balance

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Ming-Shan Wu

CONTRIBUTORS

QUESTION AT ISSUE

How should people adapt to the fact the ecosystem is out of balance in hotter and drier environment?

POSITION

objective The approach should help people to find the link and feedback between hotter and drier climate system and regional ecosystem.

SOURCE/S

Changing Ecosystems ---A USGCRP Program Element
http://www.usgcrp.gov/usgcrp/ProgramElements/bio.htm

ALTERNATE POSITIONS

objective The approach should provide an information platform that link research results to strategic and sustainable solutions.

objective The strategies should present a regional environmental protection activities.

BACKGROUND AND ARGUMENTS

Ecosystems shape our societies and nations by providing essential renewable resources and other benefits. Ecosystems sustain human life by providing the goods and services it depends on, including food, fiber, shelter, energy, biodiversity, clean air and water, recycling of elements, and cultural, spiritual, and aesthetic returns.

Global change is altering the structure and functioning of ecosystems, which in turn affects availability of ecological resources and benefits, changes the magnitude of some feedbacks between ecosystems and the climate system, and could affect economic systems that depend on ecosystems.

Whether environmental changes are caused by human or natural in origin, human societies face substantial challenges in ensuring that ecosystems sustain the goods and services on which we depend for our quality of life and survival itself.

The strategies should focus on how to maintain the regional ecosystem balance in order to help society respond effectively to changes that affect the goods and services provided by ecosystems.

Defining Statement

ISSUE TOPIC
Adaptivity

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Margo Horowitz

QUESTION AT ISSUE

How should elements of the system be prepared to respond to evolving and possible extreme environmental threats?

CONTRIBUTORS

POSITION

constraint — Solutions must be predictive, anticipating all possible environmental changes and threats.

SOURCE/S

EPA Global Warming Impacts
http://yosemite.epa.gov/OAR/globalwarming.nsf/content/Impacts.html

BBC Weather, Global Warming - What Can We Do? - Helen Willetts
http://www.bbc.co.uk/weather/features/global_warming2.shtml

ALTERNATE POSITIONS

objective — Solutions should focus on the most high risk areas which will be affected first and most severely.

BACKGROUND AND ARGUMENTS

Temperatures are rapidly increasing, in reaction to global warming. As rising temperatures are becoming more of a threat, making clear and logical predictions about the future climate is critical. It is necessary to address calculate the rate at which changes have take place up to present, as well as anticipating future change.

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As situations become worse and as temperatures rise, uncertainties in future predictions arise due to imperfect estimates of future emissions of greenhouse gases, which in turn depend on population growth, energy demand, and economic factors. In order to develop a successful solution, our predictions must be realistic and accurate as possible.

PROJECT
Adapting to a hotter, drier world

ORIGINATOR
Margo Horowitz

CONTRIBUTORS

SOURCE/S

How Will Agriculture Adapt to a Shifting Climate?
In IFPRI Forum, December 2006

QUESTION AT ISSUE

How will agriculture be addressed as the earth becomes increasingly hotter and drier?

POSITION

constraint Global warming will have tremendous consequences for irrigated agriculture around the world; and the welfare of the communities in regions that depend on irrigation may be critically affected by climate change.

ALTERNATE POSITIONS

objective Farmers optimally adapt to varying environmental conditionstal conditions. Thus, land prices can be used to measure the highest value use of the land

BACKGROUND AND ARGUMENTS

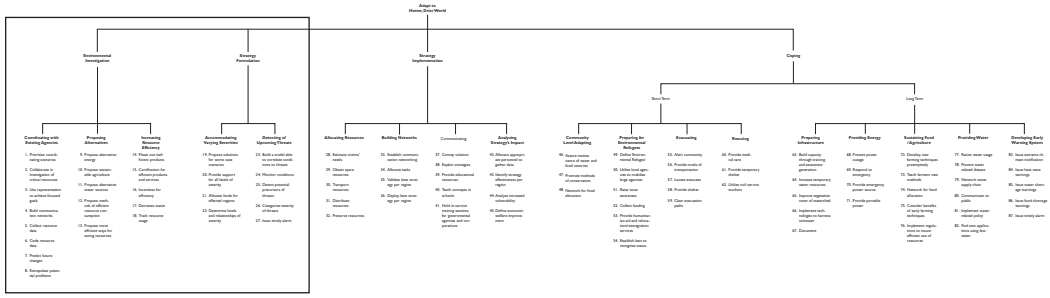
Global warming may have tremendous consequences for irrigated agriculture around the world; and the welfare of the communities in regions that depend on irrigation may be critically affected by climate change. Severe water scarcity presents the single biggest threat to future food production. Even now many freshwater sources such as underground aquifers and rivers are stressed beyond their limits. As much as 8% of food crops grows on farms that use groundwater faster than, the aquifers are replenished, and many large rivers are so heavily diverted that they do not reach the sea for much of the year. As the number of urban dwellers climbs to five billion by 2025, farmers will have to compete even more aggressively with cities and industry for shrinking resources.

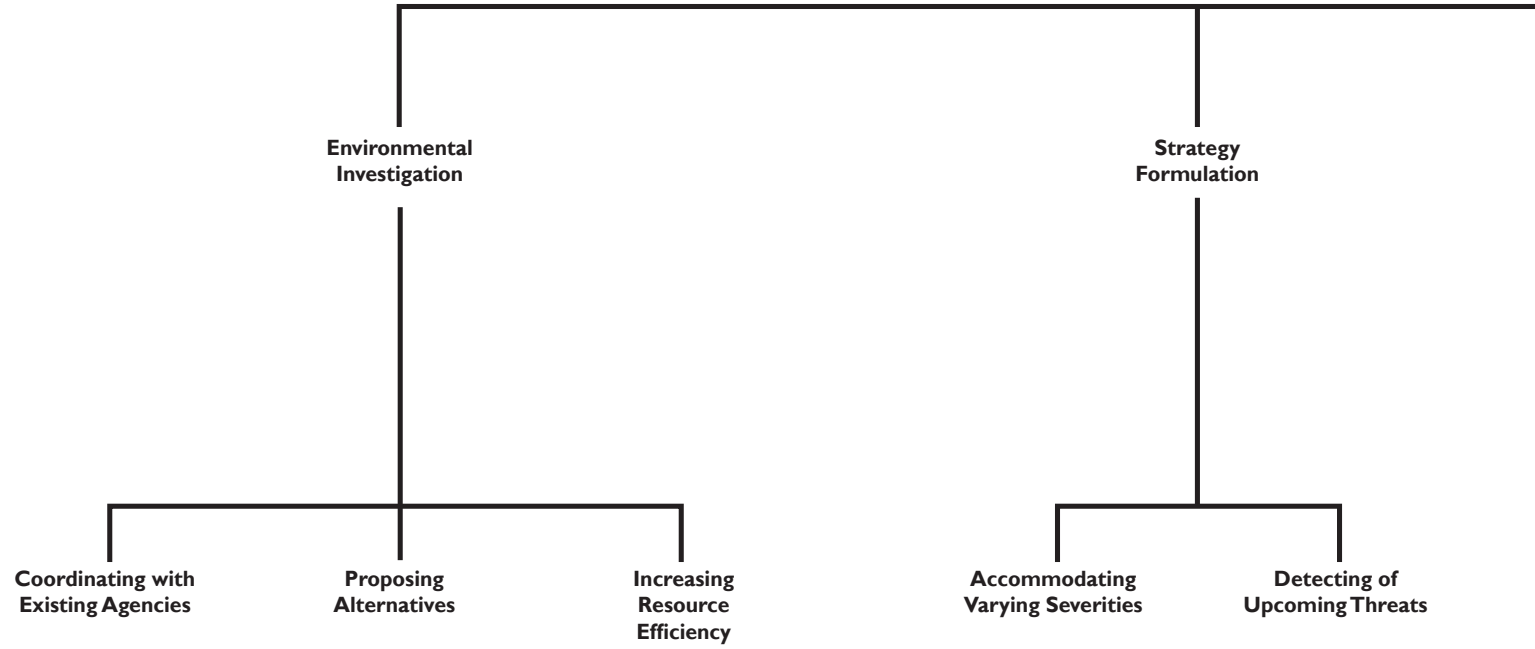
Access to water is a key condition for food production and economic development. Water shortages contribute to poverty and starvation and severely constrain industrial development. Yet today, more than 2 billion people are living in areas of the planet affected by severe weather stress and that number is expected to grow to over 4 billion over the next 25 years.

Of all the world's regions, Africa is likely to be hardest hit by the impacts of global warming. Given Africa's heavy dependence on agriculture—agriculture employs 70 percent of people in Africa—the effects of climate change could put millions of people there at greater risk of poverty and hunger. Africa is particularly vulnerable to climate change because of its high proportion of low-input, rainfed agriculture, compared with Asia or Latin America, according to Siwa Msangi, an IFPRI researcher. Farmers are already struggling to grow crops on land that contains inadequate nutrients and has little capacity to retain water.

In a November 2006 report from the United Nations (UNFCCC), climate models show that 80,000 square km of agricultural land in Sub-Saharan Africa that is currently classified as water constrained will experience more rainfall with climate change, but a much larger 600,000 square km classified as moderately water constrained will become severely water limited. This will create even more challenges for African farmers, even for subsistence crops like millet, groundnuts, and sorghum.

Farmers in developing countries will clearly need to adapt to a climate that is changing and will change further. Farming practices will have to change in many regions. In the face of drier, hotter weather, farmers may need to switch the crops they grow. For example, farmers in some areas of Africa may switch from maize to sorghum, which requires less water. Or they may switch to more drought-resistant or heat-resistant varieties of the crops they already grow.





1. Prioritize coordinating scenarios
2. Collaborate in investigation of critical resources
3. Use representation to achieve focused goals
4. Build communication networks
5. Collect resource data
6. Code resource data
7. Predict future changes
8. Extrapolate potential problems

9. Propose alternative energy
10. Propose sustainable agriculture
11. Propose alternative water sources
12. Propose methods of efficient resource consumption
13. Propose more efficient ways for saving resources

14. Phase out inefficient products
15. Certification for efficient products and services
16. Incentives for efficiency
17. Decrease waste
18. Track resource usage

19. Propose solutions for worst case scenarios
20. Provide support for all levels of severity
21. Allocate funds for effected regions
22. Determine levels and relationships of severity

23. Build a model able to correlate conditions to threats
24. Monitor conditions
25. Detect potential precursors of threats
26. Categorize severity of threats
27. Issue timely alarm

Strategies for living in a Hotter, Drier World

Strategy Implementation

Allocating Resources

28. Estimate victims' needs
29. Obtain spare resources
30. Transport resources
31. Distribute resources
32. Preserve resources

Building Networks

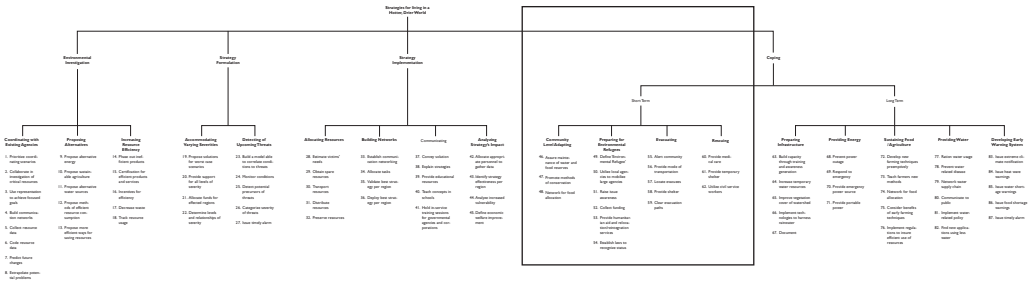
33. Establish communication networking
34. Allocate tasks
35. Validate best strategy per region
36. Deploy best strategy per region

Communicating

37. Convey solution
38. Explain strategies
39. Provide educational resources
40. Teach concepts in schools
41. Hold in-service training sessions for governmental agencies and corporations

Analyzing Strategy's Impact

42. Allocate appropriate personnel to gather data
43. Identify strategy effectiveness per region
44. Analyze increased vulnerability
45. Define economic welfare improvement



Coping

Short Term

Community Level Adapting

46. Assure maintenance of water and food reserves
47. Promote methods of conservation
48. Network for food allocation

Preparing for Environmental Refugees

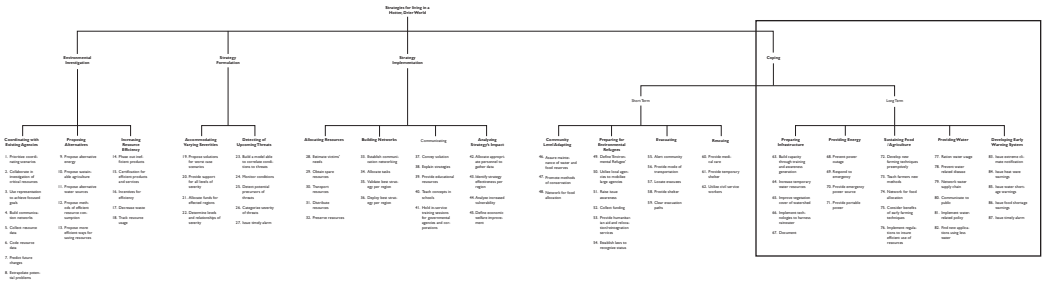
49. Define 'Environmental Refugee'
50. Utilize local agencies to mobilize large agencies
51. Raise issue awareness
52. Collect funding
53. Provide humanitarian aid and relocation/reintegration services
54. Establish laws to recognize status

Evacuating

55. Alert community
56. Provide mode of transportation
57. Locate evacuees
58. Provide shelter
59. Clear evacuation paths

Rescuing

60. Provide medical care
61. Provide temporary shelter
62. Utilize civil service workers



Coping

Long Term

Preparing Infrastructure

63. Build capacity through training and awareness generation
64. Increase temporary water resources
65. Improve vegetation cover of watershed
66. Implement technologies to harness rainwater
67. Document

Providing Energy

68. Prevent power outage
69. Respond to emergency
70. Provide emergency power source
71. Provide portable power

Sustaining Food / Agriculture

72. Develop new farming techniques preemptively
73. Teach farmers new methods
74. Network for food allocation
75. Consider benefits of early farming techniques
76. Implement regulations to insure efficient use of resources

Providing Water

77. Ration water usage
78. Prevent water related disease
79. Network water supply chain
80. Communicate to public
81. Implement water-related policy
82. Find new applications using less water

Developing Early Warning System

83. Issue extreme climate notification
84. Issue heat wave warnings
85. Issue water shortage warnings
86. Issue food shortage warnings
87. Issue timely alarm

Design Factor

TITLE

Alternatives are possessed by other political entities

DF-1

PROJECT	Adapting to a hotter, drier world	SOURCE/S Freshwater conflict Personal observation	ASSOCIATED FUNCTIONS Propose sustainable agriculture
MODE	Environmental Investigation/ Critical Resources		
ACTIVITY	Proposing Alternatives		
ORIGINATOR	Chun-Juei Chou		
CONTRIBUTORS			

OBSERVATION

Due to political separation and beneficial conflict, spare resources cannot be shared with other political entities that needs it.

EXTENSION

Due to political separation and beneficial conflict, spare resources cannot be shared with other political entities that needs it. For example, freshwater has been associated with conflicts among neighboring countries. In Africa, Central Asia, West Asia and the Americas, several countries currently or potentially are involving in international disputes over access to river water, inland seas and aquifers. They are arguing fiercely and confrontations could arise as water shortages grow.

Thus, as hotter, drier impacts grows seriously, living resources such as energy, water and food becomes expensive or even insufficient for everyone. Political entities have responsibility to ask for emergent resource supply from other political entities. (In fact, people suffering common impacts should collaborate to overcome the difficulties. Just like those farmers who took care each other in severe winter times in Greenland mentioned by Jared Diamond in his book, Collapse.)

DESIGN STRATEGIES	SOLUTION ELEMENTS
Share spare resources cross political entities	[M] Resources storehouse cross political entities
Collaborate in developing living resources cross political entities	[S] Living Resources Project cross political entities

VERSION 2 DATE 15 October 2006 DATE OF FIRST VERSION 10 October 2006

Design Factor

TITLE

Alternatives locate out of this system scope

DF-2

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation/ Critical Resources
ACTIVITY	Proposing Alternatives
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Diamond, Jaret Collapse. How societies Choose to Fail or Succeed. New York: Penguin Group Inc., 2005.

Personal observation

ASSOCIATED FUNCTIONS

Propose alternative water sources

OBSERVATION

Apply alternatives out of system scope must cost more money, time and energy than those self-produced resources.

EXTENSION

According to Jared Diamond's book, Collapse, the pioneer farmers on Greenland needed to go to remote area for hunting animals such as seals, fishes or mussels because their agriculture productivity was not sufficient for everyone in severe winter times. This case tells that if food supply is not sufficient, people need to look for alternative food out of their territory.

However, several conditions makes this food-hunting mission difficult. For example, the unknown territory might threaten hunter's lives. If those pioneer farmers on Greenland were not familiar with sea water and how seals behave. It is very dangerous to hunt. In addition, going a far way does not promise finding out alternative food supply. Thus, experienced guide to where there is food supply or well planning in advance are necessary. Also, once getting alternative food, how to deliver back to those who need are another tough mission.

Thus, several problems takes place when look for alternative resources out of existing system scope. Political authority needs to be concerned with it.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Locate alternative resources out of system scope	[S] Resources locators cross political entities
Apply existing delivery agencies cross political entities	[M] Cross Express for delivering resources

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 10 October 2006

Design Factor

TITLE

Alternatives are not sufficient

DF-3

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation/ Critical Resources
ACTIVITY	Proposing Alternatives
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Energy Development
http://en.wikipedia.org/wiki/Alternative_energy#Cons_4

Climate change and agriculture
http://en.wikipedia.org/wiki/Global_warming_and_agriculture

Global Warming
http://en.wikipedia.org/wiki/Global_warming#Effects_on_ecosystems

ASSOCIATED FUNCTIONS

Propose alternative energy

OBSERVATION

What a civilization consumes is more than its natural environment can produce.

EXTENSION

Most kinds of alternative resources are neither sufficient nor applicable. For example: Solar power is not always completely predictable because it depends on the amount of sunlight that reaches the Earth at any given time. Wind power is intermittent in many locations. When the wind speed decreases, the energy production is not fully predictable. Hydroelectric energy can only be used in areas where there is a large supply of water.

Likewise, any short-term fluctuations of the climate can have dramatic effects on the agricultural productivity. Thus, global warming has a direct influence on food supply. Also, an increase in the amount of carbon dioxide levels would also have effects, both detrimental and beneficial, on crop yields.

Also, global warming results in the melt of glaciers that is a large and reliable source of water for China, India and much of Asia, and these waters form a principal dry-season water source. Increased melting would cause greater flow for several decades, after which some areas of the most populated region on Earth are likely to run out of water.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Minimize consumption	[S] AdaptiveNet
Minimize waste	[M] Sustainable products
Recycle waste resources	[M] Resources recycling system

Design Factor

TITLE

Applying alternatives disturb normal life

DF-4

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation/ Critical Resources
ACTIVITY	Proposing Alternatives
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Energy development
http://en.wikipedia.org/wiki/Alternative_energy

Sustainable agriculture
http://en.wikipedia.org/wiki/Sustainable_agriculture

Recycling
http://en.wikipedia.org/wiki/Recycling#Recycling_techniques

ASSOCIATED FUNCTIONS

Propose alternative energy

Propose sustainable agriculture

Propose alternative water sources

Propose more efficient ways in consuming resources

Propose more efficient ways in saving resources

OBSERVATION

The application of alternative resources is inconvenient for consumers and costs money for businesses.

EXTENSION

Applying alternative resources cost consumers additional money and efforts. For example, if using solar power, a solar power system with solar thermal panels, power transport and power storage are very expensive and the energy payback time is between 2 to 3 years.

About agriculture, unsustainable agriculture continues because it is financially more cost-effective than sustainable agriculture in the short term. It's because sustainable food usually sold at a remote location incurs a different set of energy cost for materials, labour, and transport.

About recycling and reuse, successful recycling depends heavily on the sorting of usable waste. However, there are many different materials can be recycled but each type requires a different technique. It would be an annoying efforts to do so. Likewise, reuse often requires cleaning or transport so that people need to spend time doing so. Further, sorting and preparing items for reuse takes time, which is inconvenient for consumers and costs money for businesses.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Reduce efforts in applying alternatives	[S] Alternatives Application Agency (www.aaa.org)
Consult for efficient consumption	[M] Efficiency Consumption Agency (www.eca.org)

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 10 October 2006

Design Factor

TITLE

Conditions occur out of system scope

DF-5

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Detecting of upcoming threats
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Personal observation

ASSOCIATED FUNCTIONS

Monitor hotter, drier conditions

Detect potential precursors of threats

OBSERVATION

Fail to track threats out of system scope makes the frontier in danger.

EXTENSION

Hotter, drier conditions result in extreme weather change all over the world. Extreme weather such as tropical cyclones, heat waves and droughts probably takes shape in one continent and then threaten in another. If existing political entities such as countries, cities or regions rely merely on their own capability in monitoring and detecting hotter, drier impacts. They are still passively reported potential threats by agencies out of their system scope.
Their reaction to avoid or mitigate damage must be too urgent or too late to be successfully completed.

Without an superior or intermediate organization that assists to make decisions and transfer information, each political entity must take more time to identify the upcoming threats and to response with reactions and take measures. It must cost great amount of damage especially on the frontier with population.

DESIGN STRATEGIES

Speed up forecasting and warning

SOLUTION ELEMENTS

[M] AutoAlert

[M] City Sign

[M] Remote Warning Notification

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 12 October 2006

Design Factor

TITLE

Data collected proves inconclusive

DF-6

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation/ Critical Resources
ACTIVITY	Predicting Resources
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Weather forecasting
http://en.wikipedia.org/wiki/Weather_prediction

Earthquake prediction
http://en.wikipedia.org/wiki/Earthquake_prediction

Personal observation

ASSOCIATED FUNCTIONS

Depict changes on resources

OBSERVATION

Incomplete data makes the prediction on critical resources less conclusive.

EXTENSION

For concluding the changes on critical resources, predicting process must be standardized. For example:
(1) The application of current technology, methods, theories, reasoning
mechanism, computer database and so on must be specified.
(2) How much data are needed. That is, how many days/how many agencies/how geographically large of ground observation proves a fact of the current state of critical resources.

Unfortunately, the chaotic nature of the hotter, drier impacts and incomplete understanding of the prediction mean that conclusion on critical resources become less accurate as the range of the prediction increases.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Standardize the predicting process on critical resources	[S] The World Resources Organization
Prioritize the potential precursors of critical resources	[S] Critical resource database

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 10 October 2006

Design Factor

TITLE

Insufficient resource data

DF-7

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation/ Critical Resources
ACTIVITY	Predicting Resources
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	Ido Mor

SOURCE/S

Famine early warning systems network http://en.wikipedia.org/wiki/Famine_Early_Warning_System

Personal observation

ASSOCIATED FUNCTIONS

Collect resource data

OBSERVATION

Collecting data on critical resources requires advanced devices that can process on-the-ground monitoring of local conditions.

EXTENSION

Collecting current information, data or other facts on critical resources requires the cooperation of regional agencies spread nation-wide or even world-wide. In addition, regional agencies need to investigate not only the facts of critical resources but also those hotter, drier impacts that cause resources becomes critical.

However, the problem is where there is (or will be) happening a crisis of critical resources. Although existing agencies can monitor and report any fact of critical resources in their regions, the scope they cover is still limited and it is difficult to make ground observations in some remote or dangerous areas. For example, instead of doing ground observation, scientists predict the facts of El Nino based on many temperature data recorded by thermometers on hundreds of floats in Pacific Ocean.

DESIGN STRATEGIES

Deploy monitors in remote area

SOLUTION ELEMENTS

[S] Remote Monitor Project for critical resources

[S] Personal monitor device for critical resources

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 10 October 2006

Design Factor

TITLE

More severe threats than ever

DF-8

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Detecting of upcoming threats
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Extreme weather
http://en.wikipedia.org/wiki/Extreme_weather

Personal observation

ASSOCIATED FUNCTIONS

Categorize severity of threats

OBSERVATION

Hotter, drier conditions result in more severe weather catastrophes than ever.

EXTENSION

Increasing dramatic weather catastrophes are due to an increase in the number of severe events and an increase in population densities which increase the number of people affected and damage caused by an event of given severity. Further demographic changes and the effects of global warming are expected to continue this trend.

The World Meteorological Organization has suggested a possible link between increasing extreme weather events and global warming. The increasing number of category 4 and 5 hurricanes is directly linked to increasing temperatures. Similarly, hurricane power dissipation is highly correlated wit temperature reflecting global warming. Hurricane modeling has produced similar results. For example, hurricanes, simulated under warmer, high-CO2 conditions, are more intense than under present-day conditions. Greenhouse gas–induced warming may also lead to increasing occurrence of highly destructive category-5 storms.

DESIGN STRATEGIES

Simulate worst-case scenario

Enhance current emergency measures

SOLUTION ELEMENTS

[M] Zoned Evacuation

[M] Power Outages

[S] MediKit

VERSION 2 DATE 15 October 06 DATE OF FIRST VERSION 30 September 06

Design Factor

TITLE

Neglect of regional hotter, drier condition

DF-9

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Detecting of upcoming threats
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Personal observation

ASSOCIATED FUNCTIONS

Monitor hotter, drier conditions

OBSERVATION

Neglecting regional hotter, drier conditions fails disaster prediction.

EXTENSION

Weather and environmental changes usually occur on a regional basis. For example, tropical cyclones always take place in remote ocean. Modern weather forecasting rely heavily on the first hand data recorded by remote regional weather station or global weather satellite. In this way, early warning can be issued to public in time. Besides, extreme environmental conditions such as volcanic eruption pose a particular observation challenge. As these dangerous conditions are taking shape, only few local agencies are available on the site. Surface level observations are generally available only when those conditions are passing over an regional agency or if it has overtaken an unfortunate political entity. Even in these cases, real-time measurements are generally impossible because the periphery of the conditions are catastrophic.

What worse is, hotter, drier conditions and their precursors are more difficult to be detected. Therefore, how to identify the upcoming hotter, drier impacts based on those weather data reported by regional agencies is going to be a complicated function this system needs to be concerned with.

DESIGN STRATEGIES

Record regional data relative to hotter, drier conditions

SOLUTION ELEMENTS

[E] Regional data recording system

[M] Hierarchical reporting network

VERSION 2 DATE 15 October 06 DATE OF FIRST VERSION 12 October 06

Design Factor

TITLE

Too much data to be accurately identify

DF-10

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation/ Critical Resources
ACTIVITY	Predicting Resources
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Weather Forecasting
http://en.wikipedia.org/wiki/Weather_forecasting

Personal observation

ASSOCIATED FUNCTIONS

Predict future changes

Extrapolate potential problems

OBSERVATION

Both regional and global data are need for accurately investigating critical resources.

EXTENSION

In order to investigate the changes of critical resources, a great among of data is required. The following paragraph talks about how sufficient date are gathered for reliable weather forecasting. It helps to claim that both regional and global data are needed for accurately investigating critical resources.

In the case of weather forecasting, scientists spent decades of years figuring out how many and what kinds of data they need for reliable weather forecasting. Generally, two ways of data collection are applied: using radiosondes and satellites. A radiosonde is used in weather balloons that measures various atmospheric parameters and transmits them to a fixed receiver. Weather satellites are used due to their global coverage. They can be used to track individual weather condition from one time to the next to forecast weather globally. To compared, the satellite data has the advantage that coverage is global, however the accuracy and resolution is not as good as radiosondes.

DESIGN STRATEGIES

Apply global monitors

Enlarge the data category variously and geographically

Increase local monitors

SOLUTION ELEMENTS

[M] SatScan (Satellite)

[S] Auto-Recording devices for critical resources

VERSION 3 DATE 15 October 06 DATE OF FIRST VERSION 10 October 06

Design Factor

TITLE

Unable to respond in time

DF-11

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Detecting of upcoming threats
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Tsunami warning system
http://en.wikipedia.org/wiki/Tsunami_warning_system#Conveying_the_warning

Personal observation

ASSOCIATED FUNCTIONS

Detect potential precursors of threats

Issue timely alarm

OBSERVATION

No existing system can issue a timely warning against hotter/drier impacts.

EXTENSION

No system can protect against a very sudden disaster. For example, a devastating tsunami occurred off the coast of Hokkaido in Japan as a result of an earthquake on July 12, 1993. As a result, 202 people on the small island of Okushiri, Hokkaido lost their lives, and hundreds more were missing or injured. This tsunami struck just three to five minutes after the quake, and most victims were caught while fleeing for higher ground and secure places after surviving the earthquake.

While there remains the potential for sudden devastation as a result of hotter, drier conditions, warning systems should be more effective. Unfortunately, hotter, drier impacts are not like tsunami that occurs obviously and devastates badly. No one knows how many minutes/hours/days a warning should be issued prior to a upcoming drought, heat wave or insect invasion.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Plan what to do against threats in peace time	[S] Preparation guidelines against threats for different political entities
Plan what to do right before threats is coming	[S] Emergency actions against threats for different political entities

VERSION 2 DATE 15 October 06 DATE OF FIRST VERSION 11 October 06

Design Factor

TITLE
Uncertain the reliability of prediction

DF-12

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation
ACTIVITY	Predicting Resources
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Earthquake prediction
http://en.wikipedia.org/wiki/Earthquake_prediction

ASSOCIATED FUNCTIONS

Predict future changes

Extrapolate potential problems

OBSERVATION

No appropriate reaction can be applied if the prediction of critical resources is unreliable.

EXTENSION

With regard to the prediction on critical resources, scientists try to associate any impending crisis of critical resources with such potential precursors as heat waves, water shortage, foul weather conditions, deforestation, decertification, the collapse of local ecosystem and so on. In this way, they hope the observed weather and environmental changes foreshadows the changes of critical resources by such observable phenomena.

However, controversy must be arisen because conclusions are only made from a small data set, sometimes without well-understood physical phenomenon in mind to explain the claims. This is particularly a problem when the data set is noisy or there are questions regarding how it is gathered. Thus, a meaningful prediction on critical resources must have standardized information.

In addition, a meaningful prediction must notice a specific area, timeframe, the level of changes on critical resources and the probability compared to random chance.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Propose future changes of critical resources	[S] Future scenario of critical resources
Categorize the reliability of prediction	[S] Prediction classification of critical resources

VERSION 2 DATE 15 October 06 DATE OF FIRST VERSION 10 October 06

Design Factor

TITLE

Unclear what the major/minor changes are on resources

DF-13

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation
ACTIVITY	Predicting Resources
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Weather forcasting
http://en.wikipedia.org/wiki/Weather_prediction

ASSOCIATED FUNCTIONS

Code date on resources

OBSERVATION

The correlation between variables of weather/resources changes and the facts of critical resources are not clear.

EXTENSION

Although computers are able to compare billions of data in seconds, it is humans that code or categorize what to compare. To clearly know what major/minor changes indicate critical resources, scientists need to broadly gather data and establish the correlation between variables of weather/resources changes and the facts of critical resources. Unfortunately, it might take decades to hundred of years.

For example, today, we benefit by precise weather forecasting because the numerical weather prediction (NWP) have been developed since 1922.
Actually, those major/minor changes on weather such as atmospheric pressure, temperature, wind speed, wind direction, humidity, precipitation are collected routinely today because they are standardized by scientists through long-term research.

DESIGN STRATEGIES

Research on world-wide critical resources

Standardize the researching practices

SOLUTION ELEMENTS

[S] Mobile research station for critical resources

[S] StandardFit

VERSION 2 DATE 20 October 06 DATE OF FIRST VERSION 10 October 06

Design Factor

TITLE

Unknown chain reaction caused by hotter, drier conditions **DF-14**

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Detecting of upcoming threats
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Global warming
http://en.wikipedia.org/wiki/Global_warming#Predicted_effects

ASSOCIATED FUNCTIONS

Build a model able to correlate hotter, drier conditions to threats

OBSERVATION

The effects of hotter, drier conditions are more variously and seriously than what we predict.

EXTENSION

The predicted effects of global warming are many and various, both for the environment and for human life. These effects include sea level rise, impacts on agriculture, reductions in the ozone layer, increased intensity and frequency of extreme weather events, and the spread of disease. In some cases, the effects may already be manifest, although it is difficult to attribute specific natural phenomena to long-term global warming.

The extent and likelihood of these consequences is a matter of considerable controversy. Although a summary of possible effects and recent understanding can be found in the report of existing researches, some scientists believe global warming is already causing death and disease across the world through flooding, environmental destruction, heat waves and other extreme weather events.

DESIGN STRATEGIES

Compare long-term environmental change

Compare long-term weather change

SOLUTION ELEMENTS

[S] Satellite for monitoring geographical change

[S] Database for monitoring geographical change

VERSION 2 DATE 15 October 06 DATE OF FIRST VERSION 11 October 06

Design Factor

TITLE

Without public's cooperation

DF-15

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation/ Critical Resources
ACTIVITY	Proposing Alternatives
ORIGINATOR	Chun-Juei Chou
CONTRIBUTORS	

SOURCE/S

Recycling
http://en.wikipedia.org/wiki/Recycling

An Inconvenient Truth
http://www.climatecrisis.net

ASSOCIATED FUNCTIONS

Propose more efficient ways in consuming resources

Propose more efficient ways in saving resources

OBSERVATION

Without motivation, benefit or convenience, people are inactive to apply alternative resources.

EXTENSION

The cases mentioned below indicate sustainability will not work without public's cooperation. Therefore, both moderate and strict ways for applying sustainable resources are needed, especially for people living in a hotter, direr world.

Case 1: In the US, an estimated 70% of heavy metals in landfills come from discarded electronics. Some regional governments are attempting to curtail the accumulation of electronics in landfills by passing laws obligating manufacturers and consumers to recycle these devices, but because in many cases safe dismantlement of these devices in accordance with first world safety standards is unprofitable.

Case 2: The average American generates about 15,000 pounds of carbon dioxide every year. An average American can also save 2,400 pounds of carbon dioxide a year by recycling half of the waste his or her household generates. Unfortunately, the current recycling rate is far behind this ideal because people are inactive to recycle without motivation or benefit.

DESIGN STRATEGIES

Reward and subsidize the application of alternatives

SOLUTION ELEMENTS

[S] Sustainable buildings

[S] Sustainable Living Project cross political entities

VERSION 2 DATE 15 October 06 DATE OF FIRST VERSION 11 October 06

Design Factor

TITLE

Funds not evenly distributed for different regional impacts **DF-16**

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Accommodating Varying Severities
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

Relief Agencies Look Inward; Poor Planning Hurt Response to Tsunami, Assessment Finds; [FINAL Edition]

Michael Casey. The Washington Post. Washington, D.C.: Sep 24, 2006. pg. A.26

ASSOCIATED FUNCTIONS

Allocate funds for effected regions

OBSERVATION

Resources are not always distributed accordingly, based on levels of environmental degradation caused by increased temperature and drier conditions.

EXTENSION

Although industrialized nations have agreed to provide financial assistance to areas where disaster have occurred, most prefer to funnel their funds through existing institutions. For example, of the $75 million in U.S. aid pledged today, $50 million would go to the World Bank's Global Environmental Facility for distribution to developing nations. (Casey)

Days after the tsunami hit on Dec. 26, 2004, relief groups rushed in alongside the U.S. military and other government agencies, and their quick response was credited with preventing an even greater disaster.

But as aid agencies shifted to reconstruction, excessive amounts of money meant that spending decisions were often driven by "politics and funds, not assessment and needs," according to the Tsunami Evaluation Coalition, an independent body that includes more than 40 humanitarian agencies and donors. The coalition called the aid effort "a missed opportunity." It said there were too many inexperienced aid groups working in disaster zones, while seasoned agencies jumped into areas they knew nothing about. (Casey)

DESIGN STRATEGIES	SOLUTION ELEMENTS
Implement policy to allocate funds appropriately.	[S] Policy
Design effective methods to measure regional impacts	[S] Rating system database

VERSION 2 DATE October 15 06 DATE OF FIRST VERSION 5 October 06

Design Factor

TITLE

Levels of severity not clearly defined

DF-17

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Accommodating Varying Severities
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

ime v. 160 no9 (Aug. 26 2002) p. 46-7 Journal Code: Time Additional Info: United States

Journal of Applied Meteorology v. 40 no4 (Apr. 2001) p. 762-75 Journal Code: J Appl Meteorol

ASSOCIATED FUNCTIONS

Provide support for all levels of severity

OBSERVATION

Severe patterns in weather and disaster is now inevitable, due to limited and delayed preventive action. Only educated predictions have been made, but no human can determine the exact degree of Global warming's severity .

EXTENSION

Many scientists are not convinced that the weather has gone completely wild; however, some have started to cautiously and hesitantly say that extreme weather events are occurring more often than at any time in the 20th century. Although these events are consistent with the profile of a world that is getting warmer, computers are still not capable of predicting how something as simple as global warming might exert local effects on climate.

With the current concern for global warming it is reasonable to suppose that they may increase in frequency, severity, duration, or areal extent in the future. However, in the absence of an adequate definition of a heat wave, it is impossible to assess either changes in the past or possible consequences for the future.

Even if scientists could find good numbers, computer resolution is still too coarse to be able to forecast how something as simple as warming might affect climate in specific spots on the globe.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Prepare a system to function under the most severe climate conditions.	[S] Climate Control Sensor
Create technology to determine levels of severity.	[S] Severity meter

VERSION 2 DATE 10 Octoberr 06 DATE OF FIRST VERSION 23 September 06

Design Factor

TITLE

Problematic unforeseen chain reactions

DF-18

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Accommodating Varying Severities
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

Decision making for reducing vulnerability given new climate predictions: Case studies from metro Boston and rural Zimbabwe. by Suarez, Pablo, Ph.D., Boston University, 2005.

ASSOCIATED FUNCTIONS

Assess/determine levels and relationships of severity

OBSERVATION

Climate forecasts have the potential to reduce the negative effects of natural hazards, but much needs to be investigated on how decision makers actually respond to such information and prepare for those unforeseen outcomes.

EXTENSION

Unpredictable events are inevitably going to occur as a result of global warming and hotter, drier conditions. These unforeseen events must be accounted for and the system must be flexible enough to accommodate potential problems. There is a strong need to study the factors contributing to an effective and successful adoption of hazard mitigation measures. The nation as well as local jurisdictions would reap rich benefits by reducing the local communities' vulnerability to disasters through the incorporation of hazard reduction measures at community level. The existence of strong pre-disaster institutional regulations help local jurisdictions promote the adoption of mitigation during recovery.

There are many scenarios that have been suggested that could happen in the future. Some are certain to happen and will almost certainly effect humanity, but will only happen on a very long time frame. Others are likely to happen in a shorter time frame, but will probably not effect civilization in such an abrupt way. Still others are extremely unlikely, and may even be impossible. We must be prepared for any situation.

DESIGN STRATEGIES

Design flexible plan to accommodate unexpected reactions.

SOLUTION ELEMENTS

[S] Unforeseen disaster eye

[S] Visionary Observatory

VERSION 2 DATE 31 October 06 DATE OF FIRST VERSION 5 October 06

Design Factor

TITLE

Too much information to analyze

DF-19

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Formulation
ACTIVITY	Defining Strategic Intent
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

An adaptive machine learning approach to knowledge discovery in large datasets

by Ewert, Kevin, Ph.D., Nova Southeastern University, 2006, 160 pages; AAT 3215162

ASSOCIATED FUNCTIONS

Interpret the problems and constraints

Define position

Gather and analyze information

Evaluate feasibility of the objective

Generate quantifiable goals of strategy

OBSERVATION

Analyzing the vast amount of available data is a tedious process, which is an impossible task given amount of time to interpret the existing problems and constraints.

EXTENSION

Large text databases, such as medical records, on-line journals, or the Internet, potentially contain a great wealth of data and knowledge. However, text representation of factual information and knowledge is difficult to process. Analyzing these large text databases often rely upon time consuming human resources for data mining. Since a textual format is a very flexible way to describe and store various types of information, large amounts of information are often retained and distributed as text. "The amount of accessible textual data has been increasing rapidly. Such data may potentially contain a great wealth of knowledge. However, analyzing huge amounts of textual data requires a tremendous amount of work in reading all of the text and organizing the content. Thus, the increase in accessible textual data has caused an information flood in spite of hope of becoming knowledgeable about various topics" (Nasukawa and Nagano, 2001).

DESIGN STRATEGIES

Identification method to sort through and identify most beneficial data available.

SOLUTION ELEMENTS

[S] Data Radar

[S] Data mining

VERSION 2 DATE 23 October 06 DATE OF FIRST VERSION 5 October 06

Design Factor

TITLE

Unable to predict worst case conditions

DF-20

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	Strategy Formulation	http://www.gcrio.org/gwcc/booklet2.html	Propose solutions for worst case scenarios
ACTIVITY	Accommodating Varying Severities		
ORIGINATOR	Margo Horowitz		
CONTRIBUTORS			

OBSERVATION

It is generally difficult to identify what the worst hotter, drier conditions will be as a result of global warming. Varying predictions have been made, but no hard evidence has been produced to define the most extreme effects.

EXTENSION

Most scientists believe that if significant climate change occurs it will take place gradually over a period of many decades. Farmers would have to adjust their crops, and in some cases, farming regions and other land use patterns would shift. Water supply systems would have to be modified.

There is some chance that climate change will be abrupt, perhaps brought on by a sudden shift in the general pattern of ocean circulation. If that happens, the economic costs to wealthy countries like the United States could be very large. Much new investment might be needed in a very short period of time. Agricultural and water systems might not easily be modified in just a few years, especially if uncertainty makes planning difficult. Most scientists believe that such catastrophic change is unlikely, but not impossible.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Design system to prepare for predicted worst case scenarios while leaving room for the system to adapt to worsening conditions.	[S] Adaptive Condition System
Identify key findings, such as economic, agricultural, and health, where results have been predicted	[S] Prediction record

VERSION 2 DATE 27 September 06 DATE OF FIRST VERSION 10 September 06

Design Factor

TITLE

Accuracy Problem

DF-21

PROJECT	Adapting to a hotter, drier world
MODE	Evaluation
ACTIVITY	Measuring Cost/Effectiveness
ORIGINATOR	Myongwon(Ethan) Suh
CONTRIBUTORS	

SOURCE/S

Finance, Livi Bodie & Robert C. Merton. Prentice hall, 2001.

ASSOCIATED FUNCTIONS

Find potential problems and resources for cost/benefit

Report best/worst case scenarios and its spreadsheet

OBSERVATION

Problems of accuracy on how accurately costs and benefits have been estimated.

EXTENSION

According to 'Finance for Managers' from Harvard Business Essentials, the Cost/Benefit analysis of a particular evaluation involves the following steps:
1. Identify the costs associated with new purchase or opportunity, 2. Identify the benefits of additional revenues that will result from the investment, 3. Identify the cost savings to be gained, 4. Map out the timeline for expected costs and anticipated revenues, 5. Evaluate the non quantifiable benefits and costs.
The first three steps are fairly straightforward. Begin by identifying all the costs associated with the organization - this year's up-front costs of total projects as well as those the fiancees anticipate in subsequent years of total projects. However, in the 4th and 5th step, it faces accuracy problems since the accuracy of the outcome of a cost-benefits analysis is dependent on how accurately costs and benefits have been estimated within time constraints. Inaccurate cost-benefit analysis causes substantial risk in planning, because inaccuracies of the size documented are likely to lead to inefficient decisions. Moreover, cost savings are sometimes more subtle and more difficult to recognize and quantify.

DESIGN STRATEGIES

Evaluate non quantifiable benefits and cost

Map out the timeline for expected costs and anticipated revenues

SOLUTION ELEMENTS

[S] Extract indirect costs/soft benefits

[E] Break even analysis

VERSION 2 DATE 10 October 06 DATE OF FIRST VERSION

Design Factor

TITLE

Hard to validate amount of data

DF-22

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Implementation/ Management
ACTIVITY	Establishing Networking
ORIGINATOR	Myongwon(Ethan) Suh
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Validate the best strategy for each region

Deploy the best strategy for each region

OBSERVATION

Transform information overload into promptitude reaction.

EXTENSION

In preparing strategies for living in hotter, drier world, having too much information and data vastly disorganized is like not having any. Without good information management, information piles up around the organization like soft sand, slowing its processes, inhibiting critical business decisions, and making change and correction more difficult than it ought to be. People spend too much time and effort on information maintenance and too little time focused on the organization's core activity. As a result, just keeping a pace with circumstance and vast amount of information takes more and more work. The whole organization may end up running in sand, sometimes without even knowing it.

DESIGN STRATEGIES

Fulfill gaps between systems where disorganized information is piling up.

Make recommendation on how to organize and use information more effectively

SOLUTION ELEMENTS

[S] Consulting Information Management Solutions

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Unable to determine most beneficial medium

DF-23

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	Strategy Implementation/ Communication		Communicate with public Increase awarness
ACTIVITY	Raising Awareness		
ORIGINATOR	Margo Horowitz		
CONTRIBUTORS			

OBSERVATION

When creating advertising and communication material and determining which medium to promote, it is difficult to know which will
be the most beneficial and effective.

EXTENSION

Advertising is expensive and not always effective. Advertising campaigns often end up doing more harm than good, as they induce public bias that may be negative.
It is clear that state and local governments will have to create compelling advertising.
However, through which medium is not as clear. In targeting local and global communities, some forms may get information about adapting to a hotter, drier world to the people more effectively than others.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Issue specific campaigns	[E] Community poll
Television campaigns	[E] Audience specific
Focus groups/demographic research	[E] Demographic selector
Website	[M] Hott Times website

VERSION 2 DATE 14 September 06 DATE OF FIRST VERSION 6 September 06

Design Factor

TITLE

New techniques are not easily integrated

DF-24

PROJECT	Adapting to a hotter, drier world
MODE	Coping/ Long term
ACTIVITY	Sustaining Food/Agriculture
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Teach farmers new methods

Implement new policy

Implement regulations to insure efficient use of resources

OBSERVATION

When agriculture and irrigation techniques are modified, it will be necessary to assess and possibly integrate their functions in new ways.

EXTENSION

Because introducing new techniques involves the creating of new policy or the modification of old ones in a particular region, the capacity of the land may be new or changed. Discoveries may be made along the way as to how the methods can integrate so as to improve the performance of the available resources. Thus, scientists will work with designers to integrate the functions in a way that seems most beneficial to the agricultural area.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Use iterative process to test new techniques	[M] Concept Testing Team
Integrate different methods in other regions in parallel	
Integrate the same techniques in other regions	[S] In-Field Integration

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Unable to manage the collection of data

DF-25

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	Evaluation/ Impact Analysis		Collect Data
ACTIVITY	Reporting Results		Present information
ORIGINATOR	Margo Horowitz		Standardize results
CONTRIBUTORS			

OBSERVATION

Insights and accurate results are easier to obtain from data when the collection of data is done in a structured manner with later analysis in mind.

EXTENSION

Informed results and readings rely on research protocols which provide a framework for data collection that supports later analysis and synthesis. Data collection depends on what data is collected and how. The type of data that is desired should be determined before considering the most effective way to acquire it. A standardized data entry procedure should be established before research is conducted. An iteration-focused interface may be a possible point of departure.

The problem is one of matching the appropriate research method to the task at hand. Generally, this activity requires a degree of specialization and a thorough understanding of research methods, which may not always be available.

DESIGN STRATEGIES

Match the selected projects to a standard method of data collection

Provide a list of research methods

SOLUTION ELEMENTS

[M] Standard Fit

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE
Unable to record data

DF-26

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	Evaluation/ Impact Analysis		Collect Data
ACTIVITY	Reporting Results		Present information
ORIGINATOR	Margo Horowitz		Standardize results
CONTRIBUTORS			

OBSERVATION

Data from research, especially field research, can be difficult to capture effectively for later analysis.

EXTENSION

Field research yields large quantities of data. It can be quantitative, such as exact measurements of water, or it can be qualitative, obtained from interviews with local scientists. Both types of data are valuable when conducting environmental analysis. They can be difficult to record effectively though, especially when in remote locations. When doing both qualitative and quantitative research it often becomes difficult to keep all the observational data organized for later use. Moreover, some forms of data are far more portable than others. Digital data, in the form of files is relatively easy, while artifacts can be more challenging. The problem is one of capturing data thoroughly and with adequate enough detail to be of use during analysis.

DESIGN STRATEGIES

Digitally record as much data as possible

Transfer data that is needed in a centralized location

Make data collection as portable as possible

SOLUTION ELEMENTS

[M] Standard Fit

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Farmers unable to supply enough food

DF-27

PROJECT	Adapting to a hotter, drier world
MODE	Coping/ Long term
ACTIVITY	Sustaining Food/Agriculture
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

Climate changes and food supply. Forum for Applied Research and Public Policy. Pimentel, D. 1993.

ASSOCIATED FUNCTIONS

Develop new farming techniques

Teach new irrigation methods

Implement regulations to insure efficient use of resources

OBSERVATION

Due to hotter and drier conditions, farmers are yielding less crops, which results in increased prices of food.

EXTENSION

Changes in the world's climate will bring major shifts in food production. In some places, temperatures will rise and rainfall will increase; in others, rainfall will decrease. In addition., coastal flooding will reduce the amount of land available for agriculture.

In general, food crops are sensitive to climate change. Such change, which affects soil temperature and moisture levels, also determines the vitality of both beneficial organisms and pests.

Global warming is likely to alter production of rice, wheat, corn, soybeans, and potatoes which are staples for billions of people and major food crops in North America and Africa, but regional variations will be significant.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Indroduce crops that need less water	[M] Appropriated agriculture
Develop new water harvesting methods	[S] ZebraTop
Teach communities other means to survive	[E] Solar Farming

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Project responsibilities are unclear

DF-28

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	Strategy Implementation/ Management		Delegate responsibilities
ACTIVITY	Allocating Tasks		Describe positions
ORIGINATOR	Margo Horowitz		Set performance guidelines
CONTRIBUTORS			

OBSERVATION

It is difficult for project managers to oversee global research teams and delineate their individual and group responsibilities.

EXTENSION

The complexity of the research and data collection will require an extensive level of discipline and cooperation within and between teams. More importantly, it will be necessary for managers and staff to understand their responsibilities. If the members and leaders of the project do not understand this, they run the risk of wasting valuable time and energy duplicating work or missing important components of the project.

DESIGN STRATEGIES	SOLUTION ELEMENTS
LInk responsibility to incentives	[M] Performance reviews
Publicize responsibility	[S] Proficient-Flow software
Avoid micro-management	[E] Assign leadership

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Poorly design education material

DF-29

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Implementation/ Communicating
ACTIVITY	Educating
ORIGINATOR	Ming-Shan Wu
CONTRIBUTORS	

SOURCE/S

Education by Design, Davis. Meredith C. **Arts Education Policy Review** v. 105 no5 (May/June 2004) p. 15-20

ASSOCIATED FUNCTIONS

Convey solution

Explain strategies

Provide educational resources

Teach concepts in schools

Hold in-service training sessions for governmental agencies and corporations

OBSERVATION

Teaching material for students, governmental agencies, and communities are too general.

EXTENSION

Many researchers have put lots of efforts on global warming. In order to educating the public and implementing strategy, the scientific research, related policies and even national wide protocols should be translated to different level of information to meet the needs of the diversity audience. It is very important for everyone not just generally "knowing" about global warming but "doing" something to cope with that.

DESIGN STRATEGIES

Identify level of audiences

Training teacher before teaching

Provides attractive teaching material

Use innovative education resource

SOLUTION ELEMENTS

[S] An hotter/drier experiencing classroom
[E] Teachers framework
[S] Experiencing day
[E] Story teller
[M] Safety tips
[M] Training volunteer

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Unable to imagine the scenario of hotter,drier world

DF-30

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Implementation/ Communicating
ACTIVITY	Educating
ORIGINATOR	Ming-Shan Wu
CONTRIBUTORS	

SOURCE/S

Think about tomorrow.
Henderson, Liza. **Telephony** v. 232 (Jan. 27 1997) p. 32

The Pentagon's Weather Nightmare.
Stipp, David. **Fortune** v. 149 no3 (February 9 2004) p. 100-2, 104, 106, 108

Life in a warmer world.
Scott-Moncrieff, Chloe.
Geographical (London, England: 1997) v. 77 no12 (December 2005) p. 36-7

ASSOCIATED FUNCTIONS

Convey solution

Explain strategies

Provide educational resources

Teach concepts in schools

Hold in-service training sessions for governmental agencies and corporations

OBSERVATION

Compare to the present living environment, people are not aware of the seriousness of climate change is happening.

EXTENSION

The Pentagon's strategic planners are grappling with the real possibility of global warming. Sudden climate change may occur in the not-too-distant future, and if it does, the need to rapidly adapt may overwhelm many societies, shaking the geopolitical balance of power.

The problems of communicating the impact and threat of global warming is that people doesn't realize the rapid changing of environmental condition is happening in a global scale. And its hard to link the global warming impact to their daily life to make a behavior change.

DESIGN STRATEGIES

Using scenario as a tool for future planning

Campaign for experiencing a hotter, drier world

SOLUTION ELEMENTS

[S] Hotter/drier experiencing classroom

[E] Hotter/drier photography competition

[S] Hot movies

[S] Feel it

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Bureaucracy limits policy implementation

DF-31

PROJECT	Adapting to a hotter, drier world
MODE	Coping/ Long term
ACTIVITY	Sustaining Food/Agriculture
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

U.S. Proposes Global Cut in Farm Subsidies, Tariffs; Plan Unveiled Amid Foreign Criticism of American Agricultural Aid Program. The Washington Post. Jul 26, 2002

ASSOCIATED FUNCTIONS

Develop new farming techniques

Teach farmers new methods

Implement new policy

Implement regulations to insure efficient use of resources

OBSERVATION

Policy implementation often takes years to establish, often resulting in ineffective and long overdue policy.

EXTENSION

Contrary to the desires of federal, state, and local policy makers, policies are not self-executing. After policy enactors develop legislation, various stages precede a working program. Simply because legislators express explicit intentions in policy does not guarantee those aims will be preserved through the implementation process. Frequently, implementors disagree with the conceived purpose and undermine legislative intent.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Increase lobbying efforts for agriculture policy	[E] Agriculture lobbyists
Develop strategies without government support	[S] Indi-policy
Empower officials concerned with agriculture	[E] Agri- campaign

VERSION 2 DATE 25 September 06 DATE OF FIRST VERSION 10 September 06

Design Factor

TITLE

Insufficient resources available to enforce regulations DF-32

PROJECT	Adapting to a hotter, drier world
MODE	Coping/ Long term
ACTIVITY	Sustaining Food/Agriculture
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Develop new farming techniques

Teach farmers new methods

Implement new policy

Implement regulations to insure efficient use of resources

OBSERVATION

The necessary and appropriate resources needed to enforce agriculture regulations may not be available.

EXTENSION

In order for policy to be maintained, they must be enforced. Representation to enforce these laws are limited and there are no resources allocated to mandate regulations. Resources may not be immediately available due to scarcity, distance, or financial reasons. Therefore, a solution should try to make resources available as needed.

DESIGN STRATEGIES

Don't enforce regulations

Allocate funds to enforce regulations

Create incentives for farmers to adapt to new policy

SOLUTION ELEMENTS

[S] Farm-funds

[E] Incenti Live

VERSION 2 DATE 22 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Inconsistent research criteria

DF-33

PROJECT	Adapting to a hotter, drier world
MODE	Evaluation
ACTIVITY	Analyzing strategy impacts
ORIGINATOR	Myongwon(Ethan) Suh
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Inefficient knowledge management system

No expert facilitation in developing strategy

Providing localized solutions are hard

OBSERVATION

In evaluating gathered research data, there's no consistent data due to the inconsistent research criteria for evaluation process

EXTENSION

When analyzing and evaluating strategy's impacts, in the beginning of process if the list of criteria (what to, how to) for researching vulnerability and implemented strategy is not provided consistently to the globally dispersed researchers, there also will not be gathered of consistent data from the researchers

DESIGN STRATEGIES

Provide research protocol toolkit that has set what and how to do research

Manage and execute the globally dispersed researchers with one software

SOLUTION ELEMENTS

[S] StandardFit

[S] ProficientFlow

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Inefficient knowledge management system

DF-34

PROJECT	Adapting to a hotter, drier world
MODE	Evaluation
ACTIVITY	Analyzing strategy impacts
ORIGINATOR	Myongwon(Ethan) Suh
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Inefficient knowledge management system

No expert facilitation in developing strategy

Providing localized solutions are hard

OBSERVATION

Inefficiently managing knowledge and talent resources in analyzing strategy's impacts.

EXTENSION

In preparing strategies for living in hotter, drier world, it is insufficient and inefficient in current situation at monitoring development teams and assembling globally dispersed human resources of qualified knowledge for problem solving talents and high levels of academic thinkers or thought leaderships into various regions under specific conditions due to the different impacts. It is mainly because there is no space of functioning as cross pollination to gather tremendous data and to analyze and feedback on implemented strategies' various causes & consequences and even unexpected outcomes by region and region.

DESIGN STRATEGIES

Connect detached global talent management system

Provide universal access to problem solving talent

Provide feedback place from thought leadership and think tank

Provide universal access to consult and feedback projects

SOLUTION ELEMENTS

[S] Human resource alignment on web based service

[S] Global project consulting & communities on web based service

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Managing uncertainties on risks are hard

DF-35

PROJECT	Adapting to a hotter, drier world
MODE	Evaluation
ACTIVITY	Measuring Cost/Effectiveness
ORIGINATOR	Myongwon(Ethan) Suh
CONTRIBUTORS	

SOURCE/S

Wilson, R.C. Assembly Line balancing and resource scheduling' presented in University of Michigan Summer Conference, Production and Inventory Control, 1965.

ASSOCIATED FUNCTIONS

Find potential problems and resources for cost/benefit

Report best/worst case scenarios and its spreadsheet

OBSERVATION

Uncertain to declare possible risks while making spreadsheet for best/worst scenarios.

EXTENSION

Risk is related to the expected losses which can be caused by a risky event and to the probability of failure on strategic implementation. The harsher the loss and the more likely the event, the worse the risk. Especially in given condition of scenario-based risk identification for 'Strategies living in hotter/drier world', measuring risk in spreadsheet for best/worst scenarios is difficult to evaluate mainly because of its given condition where the possible failure of a complex series of strategy implementation could result in highly undesirable or unexpected outcome. Furthermore, at some point while building best/worst case scenarios' spreadsheet, it has to deal with the variables; 1. the probability that there's a threat, 2. the probability that there are any vulnerabilities, 3. the potential impact, finally 4. loss of human life which is generally considered irreplaceable.

DESIGN STRATEGIES

Risk avoidance

Risk reduction

Risk retention

Risk transfer

SOLUTION ELEMENTS

[S] ensitivity analysis

[S] Risk management strategy

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE
Inefficient resource allocation tasks

PROJECT	Adapting to a hotter, drier world
MODE	Strategy Implementation/ Management
ACTIVITY	Establishing Networking
ORIGINATOR	Myongwon(Ethan) Suh
CONTRIBUTORS	

SOURCE/S

Wilson, R.C. Assembly Line balancing and resource scheduling' presented in University of Michigan Summer Conference, Production and Inventory Control, 1965.

ASSOCIATED FUNCTIONS

Allocate tasks

OBSERVATION

Inefficiently managing resource allocation tasks cause incompleting tasks that need to done.

EXTENSION

A resource allocation decision is a plan for using available resources fro human resources, especially in the near term, to achieve goals for the future. It is the process of allocating resources among the various projects or business units. The plan has two parts. Firstly, here is the basic allocation decision and secondly there are contingency mechanisms. The basic allocation decision is the choice of which items to fund in the plan, and what level of funding it should receive, and which to leave unfunded: the resources are allocated to some items, not to others. For the two contingency mechanisms. There is a priority ranking of items excluded from plan, showing which items to fund if more resources should become available; and there is a priority ranking of some items included in the plan, showing which items should be sacrificed if total funding must be reduced.

Typically, when resource allocation decision are left to the operating system from network, agencies, therefore, may encounter the following problems:
Excessive overhead, inefficient scheduling, inappropriate allocation of resources, and inability to manage database-specific resource.

DESIGN STRATEGIES

Enable to keep accurate time-keeping records, organize, plan, and delegate project and resource allocation of tasks whilst having an overview of organization's activity

SOLUTION ELEMENTS

[S] Proficientflow, a web-based task manager and time tracking solution

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

No enough water to provide

DF-37

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Providing water
ORIGINATOR	Myongwon(Ethan) Suh
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

No enough water to provide

Some people consume water too much

OBSERVATION

In providing water for the needs, there's lack of amount of water that can be used to supply fulfilling the demand of water utilization

EXTENSION

Water are used mainly following areas: commercial, business, residential, and industrial, agriculture utilizations. For the regions in water shortages and water scarcity, there's no enough supply of water that can meet the current demand and consumption of water.

DESIGN STRATEGIES

SOLUTION ELEMENTS

Restore water from rain — [S] Rain collection tank

Used recycled water to provide for commercial, business, residential, industrial, agriculture utilizations of water — [S] Recycled water

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Misestimation of victims' needs

DF-38

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Providing Energy
ORIGINATOR	Ming-Shan Wu
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

28. Estimate victims' needs

OBSERVATION

During the disaster, the emergency operation center can not estimate the impact of disaster to provide the first aid to the victims .

EXTENSION

In a hotter, drier climate, the worst scenario of disasters are drought, heat waves and wild fires. Victims face the fact that they need to be evacuated to temporary shelter and other safe places. The government should carefully estimate its capacity and capabilities of disaster management by providing first aid to the victims and immediate decision making . If needed, government should work with nearby cities, countries or international organization.

DESIGN STRATEGIES	SOLUTION ELEMENTS
A software that reflects regional climate change for decision making	[S] M-Soft
Provide shelter	[S] Site Shelter
	[S] Feel It
Emergency scenario practice	[M] Emergency measures for worst case scenario

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Insufficient spare resources for needs

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS Obtain spare resources
MODE	Strategy Implementation		
ACTIVITY	Allocating Resources		
ORIGINATOR	Ming-Shan Wu		
CONTRIBUTORS			

OBSERVATION

Spare rescue resources are waste of use.

EXTENSION

The victims needs are misestimated and the rescue resource from charity somehow doesn't allocate properly.
For example, after the Chi-Chi earthquake broke down central Taiwan on September 21st, 1999, the survival resource were sent to the disaster area from charity around Taiwan. However, private organizations and government collect rescue resource at the same time, which lead the waste of resource. The public and private sector should clarify their roles and work efficiently during disaster.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Resource preparing guide for hotter, drier disaster scenario	[S] Resource preparing reminder
Estimate and report regions' resource need in different type and scale of disaster	[S] Local Resource Manager [M] Community support

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Unable to get into disaster area

DF-40

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS Transport resources
MODE	Strategy Implementation		
ACTIVITY	Allocating Resources		
ORIGINATOR	Ming-Shan Wu		
CONTRIBUTORS			

OBSERVATION

Rescue resource is not able to reach the disaster because the damage of transportation infrastructure.

EXTENSION

During the drought in undeveloped countries, lacking of transportation infrastructure, overloaded or damage road slow down the pace of rescuing. The vulnerability is increasing in extreme weather condition.

DESIGN STRATEGIES

Consider alternative transportation resources

SOLUTION ELEMENTS

- [S] Survival Path
- [S] Survival GPS
- [M] Logistic planning and management

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE
Insufficient resources for local victims

DF-41

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS Distribute resources
MODE	Strategy Implementation		
ACTIVITY	Allocating Resources		
ORIGINATOR	Ming-Shan Wu		
CONTRIBUTORS			

OBSERVATION

People are lacking of water and food during the drought.

EXTENSION

In extreme weather condition in a hotter, drier world, the victims obtain rescue resource to survive, like water, foods, and medical care. While evacuating victims to temporary shelter, the victims still rely on resource distribution. If the need for different types resources are not counted exactly and reported, it is hard to allocate rescue properly.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Daily report of regional victim's need to the resource allocating center	[S] Local resource manager
Prepare resource for the disaster in case the rescue is delay	[S] Resource preparing reminder [S] Resource bank

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE
Resources expired/damaged during allocation

DF-42

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS Preserve resources
MODE	Strategy Implementation		
ACTIVITY	Allocating Resources		
ORIGINATOR	Ming-Shan Wu		
CONTRIBUTORS			

OBSERVATION

Rescue foods are expired in storage.

EXTENSION

The public/ private sector collect rescue resources and transport them to disaster area. However, delayed logistic plan and misestimated victims' needs cause the damage and expired of rescue resources, like food. In a hotter, drier world, temperature is another cause of expiring foods.

DESIGN STRATEGIES

Equally and immediately allocate resources to victims

Resource user guide

SOLUTION ELEMENTS

[S] Resource tracker

[M] Preservation guide

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE
Resources misplaced/lost damaged during allocation

DF-43

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	Strategy Implementation		Preserve resources
ACTIVITY	Allocating Resources		
ORIGINATOR	Ming-Shan Wu		
CONTRIBUTORS			

OBSERVATION

Victims's rescue resources are misplace to another region.

EXTENSION

Once the disaster brakes out in many regions at the same time, the regional needs sometimes is not reported clearly. Based on the disaster scale, the government should estimate it's capability of disaster management, to allocate rescue resource including human resource to meet a region's specific need.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Clear communication channel during disaster	[S] Hot Radio
Local needs report	[S] Local resource manager
Instant logistic transportation plan	[S] Logistic planning and management

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Unable to track resource usage

DF-44

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation
ACTIVITY	Increasing Resource Efficiency
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Phase out inefficient products

Certification for efficient products and services

Incentives for efficiency

OBSERVATION

With global population constantly rising, it difficult to track the exact amount of resources being consumed by individuals.

EXTENSION

Most of the serious problems we are facing are worsened or directly caused by very rapid population growth. These range from terrible environmental degradation to increased human misery from causes such as severe water shortages and famine. Tracking resource usage requires accounting for all humans and their economic status.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Create an organization to monitor resource consumption	[M] Efficient Consumption Agency
Develop strategies to reuse recources	[M] Resources recycling system
Track resources in other countries	[E] Living Resources Project cross political entities

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION

Design Factor

TITLE

Legal system functions too slowly

DF-45

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Preparing for Environmental Refugees
ORIGINATOR	Ido Mor
CONTRIBUTORS	Chun-Juei Chou

SOURCE/S

Copyright on the Web: what you don't know can cost you. Emily A. Vander Veer, The Writer v. 114 no3 (Mar. 2001) p. 16-18

Appeals Court Wants Microsoft Antitrust Case. Mitch Betts, Computerworld (Framingham, Mass.) v34 no25 p4 Je 19 2000

ASSOCIATED FUNCTIONS

Establish laws to recognize status

OBSERVATION

Complex situations can be drawn out over extended periods of time in trying to resolve them through the legal system. The need to establish environmental refugee status could call for a greater urgency than can be met through the legal system.

EXTENSION

DESIGN STRATEGIES

Should the need arise, temporary communities should be prepared to accommodate environmental refugees as last resort

Regional leading representative will have the authority to grant temporary status to environmental refugees

SOLUTION ELEMENTS

[M] TempHome

[M] StatusNow

VERSION 1 DATE 13 October 06 DATE OF FIRST VERSION 13 October 06

Design Factor

TITLE

Outside agencies not qualified to address problems

DF-46

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Preparing for Environmental Refugees
ORIGINATOR	Ido Mor
CONTRIBUTORS	Chun-Juei Chou

SOURCE/S

Disaster Agency's Woes Began Long Before Katrina. Bill Berkowitz. Inter Press Service, September 8, 2005

ASSOCIATED FUNCTIONS

Utilize local agencies to mobilize large agencies

OBSERVATION

Outside agencies brought in to coordinate sub-elements of system functions can cause more harm than good by their lack of experience or capacity to manage intended tasks.

EXTENSION

In April 2001, the White House announced that it planned to privatize much of the Federal Emergency Management Agency's (FEMA) work. The following year, before leaving FEMA to start his own consulting company, Joseph Allbaugh, who was running the agency at the time, helped transfer FEMA to the newly created Department of Homeland Security--an agency with no prior experience in disaster relief. Accentuating the point of 'lacked experience,' Michael Brown, a college roommate of Allbaugh who had recently lost his job with the International Arabian Horse Association (IAHA), was placed in charge of FEMA.

In 2004, FEMA signed a $500,000 contract with Innovation Emergency Management (IEM), a privately run company, to manage the risks of the hurricane-prone region of Louisiana. In effect these examples demonstrate how a chain of unqualified agencies led to the catastrophic lack of response to Hurricane Katrina and its impacts on New Orleans. Having links between the wrong organizations led to poor decision-making and execution, and in many cases lack of decision-making altogether.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Test organizations' capabilities prior to establishing working collaborations	[E] Test Capabilities
Establish periodical reviews of outside agency capabilities	[E] Reviews

VERSION 1 DATE 13 October 06 DATE OF FIRST VERSION 13 October 06

Design Factor

TITLE

Agricultural sector turns laissez-faire

DF-47

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Preparing for Environmental Refugees
ORIGINATOR	Ido Mor
CONTRIBUTORS	Chun-Juei Chou

SOURCE/S

Laissez-Faire. Mingpao Daily. September 12, 2006

Welfare Recipients' Job Skills and Employment Prospects. Gary T. Burtless. Spring 1997

ASSOCIATED FUNCTIONS

Define 'Environmental Refugee'

OBSERVATION

Making financial subsidies or humanitarian aid available, or offering other forms of government or international economic intervention will evoke a degree of laissez-faire response from the pool of potential recipients.

EXTENSION

Drawing example from the United States welfare system, there is substantial data to show dependency on outside assistance in poor labor markets. This especially comes through in prospects of welfare recipients who become dependent on cash assistance, and in higher percentages when considering their child-rearing responsibilities, low educational attainment, health limitations, transportation problems, and lack of work experience. As such cases build dependency on the system that supports them, they create higher and higher hurdles to shifting into an employment sector.

The fact is in many areas where welfare runs rampant, job opportunities exist for applicants who are willing to accept them. This is confirmed by the job-finding success of unskilled immigrants. Therefor a reasonable concern arises in establishing an official '*environmental refugee*' status, wherein regional agriculture workers may come to rely on the system and retain their refugee status.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Environmental refugees receiving humanitarian assistance are obliged to participate in continued educatio- courses to help refine their skills	[E] Continued Education
Limits are placed on the duration of humanitarian assistance	[M] Assistance Limits
Require repayment at low or fully subsidized rates	[E] Loan Repayment

VERSION 1 DATE 12 October 06 DATE OF FIRST VERSION 12 October 06

Design Factor

TITLE
People disagree with prioritization of this issue

DF-48

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Preparing for Environmental Refugees
ORIGINATOR	Ido Mor
CONTRIBUTORS	Chun-Juei Chou

SOURCE/S

Adaptive Path. Janice Fraser. http://www.adaptivepath.com/publications/essays/archives/000018.php

Strategies for Success. http://www.accd.edu/sac/history/keller/ACCDitg/SSTM.htm

ASSOCIATED FUNCTIONS

Utilize local agencies to mobilize large agencies

Raise awareness of the growing issue

Collect funding for services and aid

Provide humanitarian aid and relocation/reintegration services

Establish laws to recognize environmental refugee status

OBSERVATION

In effectively coping with a multitude of issues, constituents involved should agree on the prioritization of the issues to be addressed. Anything short of consensus results in varying degrees of ineffectiveness in reaching goals.

EXTENSION

Accomplishment of any task or series of tasks requires some degree of time management. When parties involved do not agree with the prioritization of task hierarchy it becomes increasingly difficult to properly execute set goals. This is especially a barrier when dealing with possible disaster scenarios since they are by nature time-sensitive.

It is often the case that people exhibit apprehension in accepting issues they do not experience first hand. That *environmental refugees* are not currently a recognized entity, is a reality that speaks to the urgency of addressing the issue. The task is made challenging since one of the main reasons these refugees have remained without humanitarian aid over the years is because their condition has not warranted prioritization of media coverage in comparison with more dramatic causes of leading other refugees to flee their homes (i.e. hurricanes, massive earthquakes or civil war).

DESIGN STRATEGIES	SOLUTION ELEMENTS
Lobby TV investigative news magazines, such as 60 Minutes or 20/20 to cover the urgency of this issue	[E] News Magazines
Begin publicizing the issue through organized agencies in regions to which environmental refugees relocate	[M] Agency Establishment

VERSION 1 DATE 13 October 06 DATE OF FIRST VERSION 13 October 06

Design Factor

TITLE

Subtlety in definition gives status to non-refugees

DF-49

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Preparing for Environmental Refugees
ORIGINATOR	Ido Mor
CONTRIBUTORS	Chun-Juei Chou

SOURCE/S

Environmental Asylum. In **Environment,** March 2006

The looming environmental refugee crisis. In **Ecologist,** March 1999

Creeping desert casts shadow over Mexico. In **Forum for Applied Research and Public Policy,** Fall 1996

Operation Kosovo: KRISYS NET Trip Reports, Tirana, Albania, December 1998: http://pbosnia.kentlaw.edu/projects/kosovo/tripreports/december98b.htm

ASSOCIATED FUNCTIONS

Define 'Environmental Refugee'

OBSERVATION

Currently there exists no legislation which recognizes the unique status of 'environmental refugees.' The main problem in creating such legislation lays in the difficulty to prove or enforce the status.

EXTENSION

Red Cross research found that in 1998, for the first time, more people were forced to leave their homes because of environmental disaster than because of war. The UN and international community have measures in place that acknowledge and provide humanitarian support to such refugees. In accounting for '*environmental refugees*' though, categorization bears inherent ambiguity due to the difficulty in objectively reviewing conditions/cases which force migration.

Unlike natural disasters which deal instantaneous impact, there is no instant by which bi-products of global warming, such as expanding desertification or its agricultural impacts, can be measured using short-term metrics. As a result of this, communities living on the outskirts are having to relocate their homes and occupations (often agriculture-related). These environmental refugees are slowly absorbed into neighboring communities. Recognizing them and confirming their status is a difficult task since unlike other types of natural disaster in which impact is immediately evident, expanding desertification does not occur instantaneously. Retracing the roots of these refugees and the conditions of their land is extremely labor-intensive and unless done very thoroughly, would provide ambiguous results. Failure to properly define environmental refugees would mean others could claim this status in order to receive humanitarian assistance they do not deserve.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Designate ground monitors in regions prone to desertification to certify status of communities	[M] Ground Monitor
Regional identification card to prove where you came from	[E] Region Pass

VERSION 1 DATE 10 October 06 DATE OF FIRST VERSION 10 October 06

Design Factor

TITLE

Unable to coordinate when suffering impacts

DF-50

PROJECT	Adapting to a hotter, drier world
MODE	Environmental Investigation /Critical Resources
ACTIVITY	Coordinating with Existing Agencies
ORIGINATOR	Ido Mor
CONTRIBUTORS	Chun-Juei Chou

SOURCE/S

The Katrina Breakdown. Jonathan Walters & Donald Kettl. Governing v. 19 no3 (December 2005) p. 20-2, 24-5

Hams Help Baffle Malibu Brush Fires. Lawrence J. Sachartoff, QST 87 no8 74-5 August 2003

Caught Off Guard. Christine Soares. Scientific American 288 no6 18-19 June 2003

Natural Disasters Are Man-Made. Peter Walker. New Perspectives Quarterly 16 no5 15-16 Fall

ASSOCIATED FUNCTIONS

Prioritize coordinating scenarios

Collaborate in investigation of critical resources

OBSERVATION

Lack of preparedness to unexpected scenarios leads to substantially more complex impacts since both the critical problem and the problem of organization and preparedness have to be addressed simultaneously.

EXTENSION

Hurricane Katrina was a perfect demonstration of coordination breakdown. It was exemplary of the failures in intergovernmental relationships meant to connect local, state, and federal officials before, during, and after such a disaster. The confusion demonstrated that there is a need to explicitly and thoroughly define roles and responsibilities so that system elements do not suffer the same sort of meltdown in future natural or man-made disasters.

As counterpoint we may consider the 2003 Malibu, California wildfires that broke out as a result of fallen power-lines sparking dry desert brush. This potential disaster, threatening famed Wilshire Boulevard where it meets the Pacific ocean, never got extensive media coverage because the disaster was prevented before turning out of control. A network composed entirely of volunteer fire-fighters quickly coordinated to combat the flames. Their well-managed implementation of coping strategies prevented a much more dramatic turn of events.

All too often, large-scale disasters catch victims off-guard. Lack of proper preparedness networks and multi-party collaborations act to worsen such situations, misallocating precious resources and negating effectiveness of resolutions.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Pre-planned chain of command alleviates pressures of organization-building in disaster contexts.	[E] Command Chain
Code establishment constantly transmits signal to coordinating agencies under normal conditions. Should debilitating impacts take place, signal transmission breaks to notify agencies of problem(s).	[M] Signal Transmission

Design Factor

TITLE

Unable to track environmental refugees

DF-51

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Preparing for Environmental Refugees
ORIGINATOR	Ido Mor
CONTRIBUTORS	Chun-Juei Chou

SOURCE/S

Operation Kosovo: KRISYS NET Trip Reports, Tirana, Albania, December 1998: http://pbosnia.kentlaw.edu/projects/kosovo/tripreports/december98b.htm

ASSOCIATED FUNCTIONS

Provide humanitarian aid and relocation/reintegration services

OBSERVATION

Difficulty in tracking refugees stems from several factors, complicating the task of delivering humanitarian aid and establishing an understanding of their whereabouts and migration flows.

EXTENSION

It is important to be able to track refugee migration in order to understand migration flows and deliver humanitarian supplies and services to assist those in need. Failures to establish an efficient methodology for tracking migrations result in fraudulent abuses of the system and the establishment of black market networks that thrive on such disorganization.

Unlike circumstances of war or natural disaster which displace hundreds or thousands, making them the focus of international attention, the thousands of victims falling into the categorization of '*environmental refugee*' throughout Africa, Asia and the Middle East, do not necessarily flea their homes in a drama rush, but rather in a more calculated, planned migration. Hence, these migrants are not subject to media coverage. Since these refugees are not currently recognized by traditional refugee organizations, there is no current infrastructure in place to offer them assistance or to catalog that they exist.

Further difficulty derives from indistinguishable physical attributes between refugees and the adjacent communities they may migrate towards. As the issue progresses, more and more uneducated individuals, especially in the agricultural sector throughout the world, are forced to leave their depleted lands in search of new land or other employment opportunities.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Provide incentives for environmental refugees to create ID cards	[M] ID Card Incentives
Provide environmental refugees with solar-powered hand-cranked radios embedded with tracking chips	[E] Radio Track

VERSION 1 DATE 13 October 06 DATE OF FIRST VERSION 13 October 06

Design Factor

TITLE
Public is not convinced by fact of global warming

DF-52

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Providing Energy
ORIGINATOR	Myongwon Suh
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Prevent power outage
Respond to emergency
Provide emergency power source
Provide portable power

OBSERVATION

People are still unaware the seriousness of global warming

EXTENSION

Living in hotter, drier world, people are still not convinced by the facts of global warming impacts. Because of the fact, people carelessly consume and waste energy or any kind of power source. The main reason for public's incautiousness in energy consumption is due to that they didn't actually experienced seriousness of living in hotter, drier climate crisis of global warming impacts. Another reason is that public is not learned and educated any seriousness of it.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Make public pre-experienced the out come of global warming	FeelIt
Provide hotter, drier related class	Hotter, Drier class

VERSION 2 DATE 20 Octorber 06 DATE OF FIRST VERSION 5 Octorber 06

Design Factor

TITLE

Not enough energy is provided

DF-53

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Providing Energy
ORIGINATOR	Myongwon Suh
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Prevent power outage
Respond to emergency
Provide emergency power source
Provide portable power

OBSERVATION

Difficulty in meeting the energy demand from existing energy supply system

EXTENSION

When the hotter temperature goes high, there's high energy consumption incautiousnessly using air conditioners and any heating down electronic tools to get cool water and to heat down due to the the weather condition. At that point of careless energy consumption, black out event may happen to the region which exceedly consumed energy. Preparing additional energy to meet the demand of high energy consumption must be proposed.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Produce enough energy by running day and night shift system at energy manufacturers	NightShift
Find technology of alternative energy to provide electricity	TechDetec Center

VERSION 2 DATE 20 Octorber 06 DATE OF FIRST VERSION 11 Octorber 06

Design Factor

TITLE
No alternative electricity-providing tool to public

DF-54

PROJECT Adapting to a hotter, drier world

MODE Coping

ACTIVITY Providing Energy

ORIGINATOR Myongwon Suh

CONTRIBUTORS

SOURCE/S

ASSOCIATED FUNCTIONS

Prevent power outage
Respond to emergency
Provide emergency power source
Provide portable power

OBSERVATION

Difficulty in providing electricity recharger tool to the public

EXTENSION

When the hotter temperature goes high, there's high energy consumption in incautiousnessly using air conditioners and any heating down electronic tools to get cool water and to heat down due to the the weather condition. In order to minimize energy consumption by using individual electronic devices, there must be alternative energy-providing tool to support the need of individual's electricity use, thereby to reduce the electricity consumption.

DESIGN STRATEGIES

Produce energy by running car engine and recharge individual electronic device
Provide vending machine that can recharge electronic device

SOLUTION ELEMENTS

Recharge cable
PlagInStand

VERSION 2 DATE 20 Octorber 06 DATE OF FIRST VERSION 5 Octorber 06

Design Factor

TITLE

Insufficient hierarchical report system

DF-55

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	**Strategy Implementation**	Supporting the writing of reports in a hierarchical organization http://portal.acm.org/citation.cfm?id=295682 Personal observation	Convey Solution
ACTIVITY	**Communicating**		
ORIGINATOR	**CJ Chou**		
CONTRIBUTORS			

OBSERVATION

Complicated hierarchical system prevents the efficiency of reports and performance.

EXTENSION

In many organizations, workers are required to report periodically on their activities. Such reports are often assembled in a hierarchical way. That is, reports of sub-organizations become building blocks for the report of the parent organization. Complicating the problem is the fact that organizational hierarchies are not represented as trees because individuals or sub-organizations have more than one parent organization. This means that reports of individuals or sub-organizations have to be sent to several parent organizations so that relevant portions can be extracted. The effort involved in this task often prevents the creation of reports that describe all the important activities. That is why in some international big companies with hierarchical structure, reports from several independent groups must be merged to form a single, company-wide report.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Create system-wide report format	[M] Standards for reports and communication

VERSION 1 DATE 12 October 06 DATE OF FIRST VERSION 12 October 06

Design Factor

TITLE

Inefficient internal communication system

DF-56

PROJECT	Adapting to a hotter, drier world
MODE	**Strategy Implementation**
ACTIVITY	**Building Networks**
ORIGINATOR	**CJ Chou**
CONTRIBUTORS	

SOURCE/S

Communication management
http://en.wikipedia.org/wiki/Communication_management

The influence of communication structure upon management efficiency
http://ideas.repec.org/a/taf/conmgt/v16y1998i6p661-671.html

Personal observation

ASSOCIATED FUNCTIONS

Establish communication networking

OBSERVATION

If internal communication is inefficient, system's evaluation and management will fail.

EXTENSION

Effective organizational communications are an essential precondition of effective management - without effective communication, management becomes difficult or impossible. Organizations with more than one level of management suffer from communications problems that can interfere with almost any aspect of the organization, including corrective actions.

Accordingly, an environmental crisis must stimulate the network of communications within its host system such as any political entity. This system's internal communication influences the efficiency of its crisis management. For example, if there is no standardized communication protocol between two system participants. The level of uncertainty, misunderstanding and ultimately conflict would take place and the information transfer becomes unreliable.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Design communication directives	[E] Communication platform
Access to the same information	[S] Information platform

VERSION 1 DATE 12 October 06 DATE OF FIRST VERSION 12 October 06

Design Factor

TITLE

No means to identify efficient products

DF-57

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Increasing Resource Efficiency
ORIGINATOR	Margo Horowitz
CONTRIBUTORS	

SOURCE/S

ASSOCIATED FUNCTIONS

Phase out inefficient products
Certification for efficient products and services
Incentives for efficiency
Decrease waste
Track resource usage

OBSERVATION

With so many new products on the market, it difficult to know which ones are most efficient.

EXTENSION

Consumers often purchase products without knowing how harmful or wasteful they may be. Consumers have no clear indication as to how much water, energy, or power they will be consuming or "wasting" by using certain products and services.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Create a means to identify efficient products	[M] Efficient Consumption Seal
Develop more efficient products	[S] Project Green Products
Teach public about efficiency	[E] Campaign for efficient products

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 10 September 06

Design Factor

TITLE
Unable to limit water usage

DF-58

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Providing Water
ORIGINATOR	Myongwon Suh
CONTRIBUTORS	Margo Horowitz

SOURCE/S

ASSOCIATED FUNCTIONS

Ration water usage

OBSERVATION

Due to the growing population and hotter, drier climate, there is already a decline in the amount of water that can be used to supply the demand of water utilization.

EXTENSION

Water is used mainly following areas: commercial, business, residential, and industrial, agriculture utilizations. For the regions in water shortages and water scarcity, there's no enough supply of water that can meet the current demand and consumption of water.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Collect rain water in urban area by making rain holes on ground of building, street, road, etc...	Rain holes
Make water reservoir to collect rain water for third world countries	Water reservoir

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 11 September 06

Design Factor

TITLE

Developing new applications is expensive

DF-59

PROJECT	Adapting to a hotter, drier world
MODE	Coping
ACTIVITY	Providing Water
ORIGINATOR	Myongwon Suh
CONTRIBUTORS	Margo Horowitz

SOURCES

ASSOCIATED FUNCTIONS

Find new application using less water

OBSERVATION

Developing new applications and changing infrastructure is an expensive investment.

EXTENSION

Rain water is used mainly for watering lawns, flushing toilets, and washing. New developments in rainwater collection and filtering are making it easier for people to purify and reuse their own collected water. However, many of these new technologies are extremely expensive for the average consumer to purchase as well as the front end costs of research, development and implementation.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Develop low cost solutions	RainFlower Beds
Gain local investors' support for new developments	Investor outing

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 11 September 06

Design Factor

TITLE

No means to reuse recycled water

DF-60

PROJECT	Adapting to a hotter, drier world	SOURCE/S	ASSOCIATED FUNCTIONS
MODE	Coping		
ACTIVITY	Providing Water		Find new applications using less water
ORIGINATOR	Myongwon Suh		
CONTRIBUTORS	Ming-Shan Wu Margo Horowitz		

OBSERVATION

Water that could be used for activities other than for human consumption is being wasted.

EXTENSION

Water is used mainly following areas: commercial, business, residential, and industrial, agriculture utilizations. For the regions in water shortages and water scarcity, there's no enough supply of water that can meet the current demand and consumption of water, therefore, using recycled water as often as possible is crucial.

DESIGN STRATEGIES	SOLUTION ELEMENTS
Use recycled water for residential cleaning	NEWaterCleaning
Use recycled water for residential garden irrigation	NEWaterIrrigation

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 11 September 06

Design Factor

TITLE

Too much water is being wasted on urban irrigation

DF-61

PROJECT	Adapting to a hotter, drier world	SOURCES	ASSOCIATED FUNCTIONS
MODE	Coping		No enough water to provide for the people
ACTIVITY	Providing Water		Water not being appropriately allocated
ORIGINATOR	Myongwon Suh		
CONTRIBUTORS	Margo Horowitz		

OBSERVATION

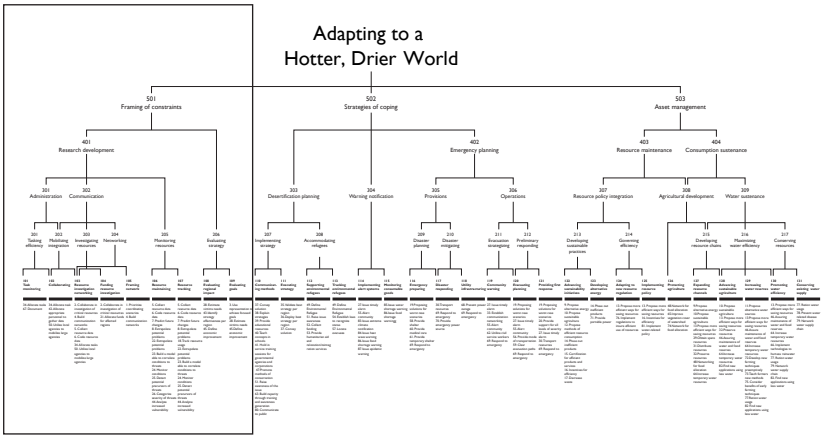
There is a lack of water to fulfill the demand of water utilization. People are being wasteful and most are not concerned with the expected water shortage.

EXTENSION

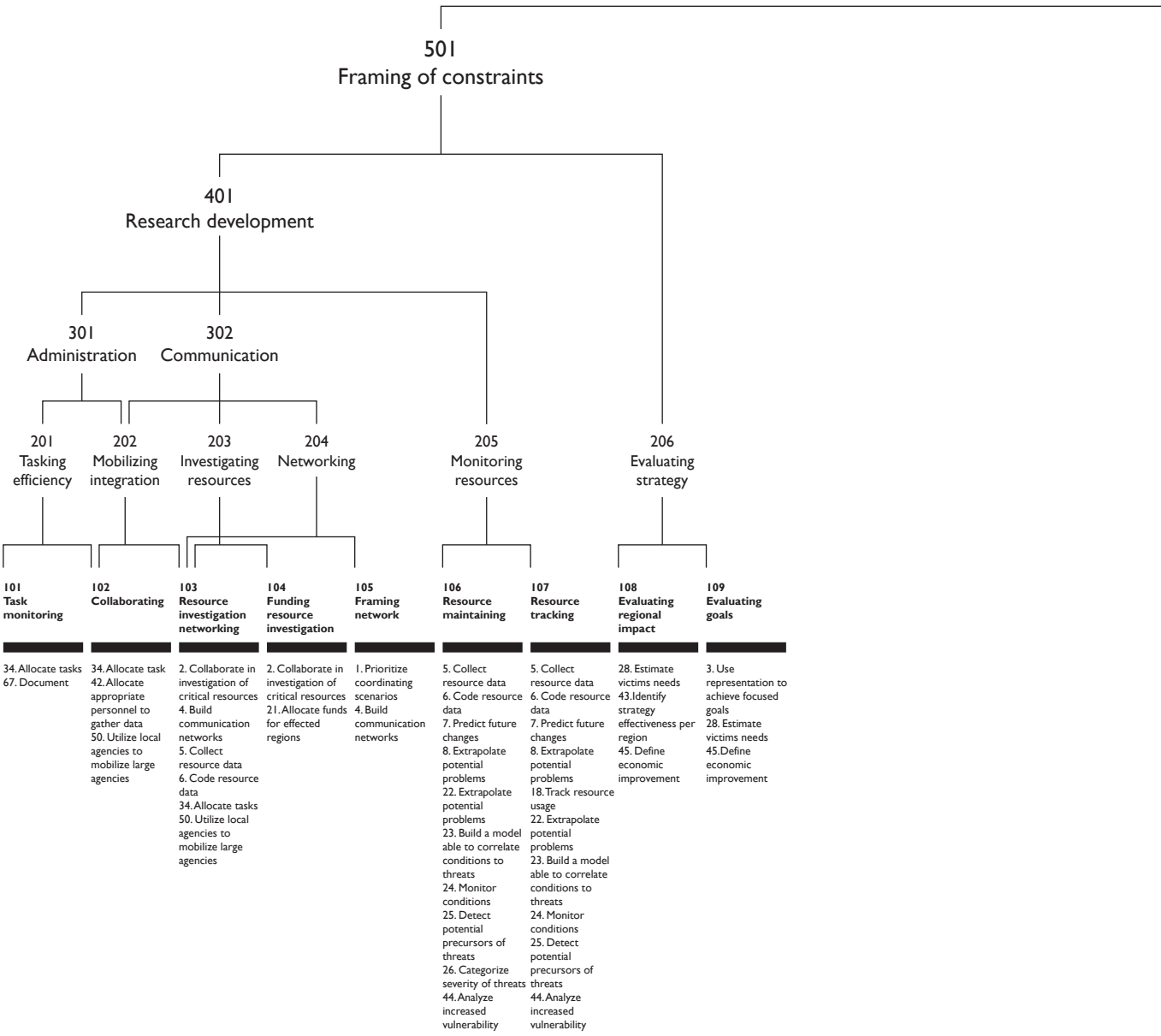
Water is used mainly for commercial, business, residential, industrial, and agriculture utilizations. For the regions in water shortages and water scarcity, there's no enough supply of water that can meet the current demand and consumption of water. Currently, home and business owners liberally irrigate their yards and landscapes with close to unlimited quantities of water.

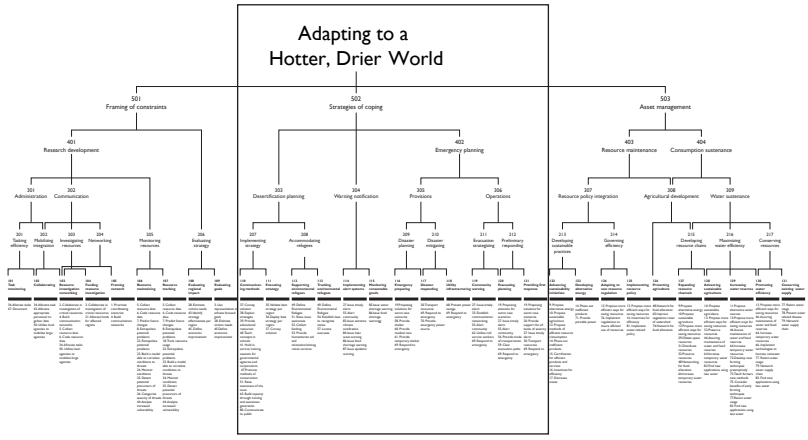
DESIGN STRATEGIES	SOLUTION ELEMENTS
Use recycled water for Golf course and sports fields	NEWaterSports
Use recycled water for Cemeteries and parks	NEWaterGrass

VERSION 2 DATE 20 September 06 DATE OF FIRST VERSION 11 September 06



Massive Change:
Information Structure





Adapting to a Hotter, Drier World

502 Strategies of coping

303 Desertification planning

207 Implementing strategy

110 Communicating methods

37. Convey solution
38. Explain strategies
39. Provide educational resources
40. Teach concepts in schools
41. Hold in service training sessions for governmental agencies and corporations
47. Promote methods of conservation
51. Raise awareness of the issue
63. Build capacity through training and awareness generation
80. Communicate to public

111 Executing strategy

35. Validate best strategy per region
36. Deploy best strategy per region
37. Convey solution

208 Accommodating refugees

112 Supporting environmental refugees

49. Define Environmental Refugee
51. Raise issue awareness
52. Collect funding
53. Provide humanitarian aid and relocation/reintegration services

113 Tracking environmental refugees

49. Define Environmental Refugee
54. Establish laws to recognize status
57. Locate evacuees

304 Warning notification

114 Implementing alert systems

27. Issue timely alarm
55. Alert community
83. Issue extreme climate notification
84. Issue heat wave warning
86. Issue food shortage warning
87. Issue epidemic warning

115 Monitoring consumable goods

85. Issue water shortage warning
86. Issue food shortage warningg

402 Emergency planning

305 Provisions

116 Emergency preparing

19. Proposing solutions for worst case scenarios
58. Provide shelter
60. Provide medical care
61. Provide temporary shelter
69. Respond to emergency

210 Disaster mitigating

117 Disaster responding

30. Transport resources
69. Respond to emergency
70. Provide emergency power source

118 Utility infrastracturing

68. Prevent power outage
69. Respond to emergency

306 Operations

211 Evacuation strategizing

119 Community warning

27. Issue timely alarm
33. Establish communication networking
55. Alert community
62. Utilize civil service workers
69. Respond to emergency

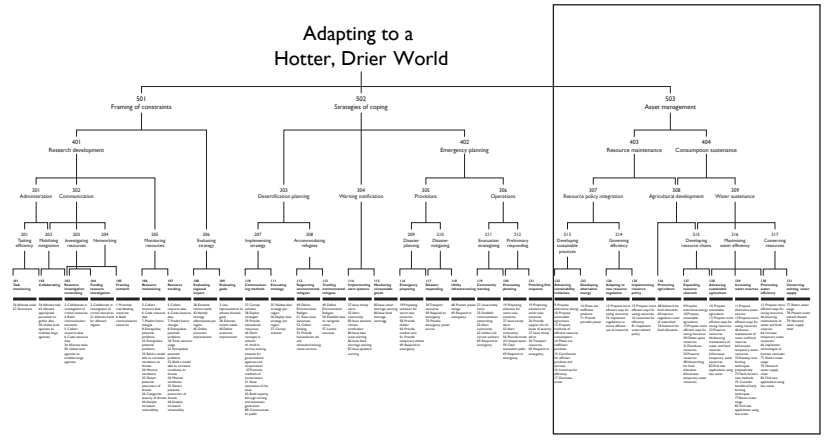
212 Preliminary responding

120 Evacuating planning

19. Proposing solutions for worst case scenarios
27. Issue timely alarm
55. Alert community
56. Provide mode of transportation
59. Clear evacuation paths
69. Respond to emergency

121 Providing first response

19. Proposing solutions for worst case scenarios
20. Provide support for all levels of severity
27. Issue timely alarm
30. Transport resources
69. Respond to emergency



503
Asset management

403
Resource maintenance

404
Consumption sustenance

307
Resource policy integration

308
Agricultural development

309
Water sustenance

213
Developing sustainable practices

214
Governing efficiency

215
Developing resource chains

216
Maximizing water efficiency

217
Conserving resources

122 Advancing sustainability initiatives

9. Propose alternative energy
10. Propose sustainable agriculture
12. Propose methods of efficient resource consumption
14. Phase out inefficient products
15. Certification for efficient products and services
16. Incentives for efficiency
17. Decrease waste

123 Developing alternative energy

14. Phase out inefficient products
71. Provide portable power

124 Adapting to new resource regulation

13. Propose more efficient ways for saving resources
76. Implement regulations to insure efficient use of resources

125 Implementing resource policy

13. Propose more efficient ways for saving resources
16. Incentives for efficiency
81. Implement water-related policy

126 Protecting agriculture

48.Network for food allocation
65.Improve vegetation cover of watershed
74.Network for food allocation

127 Expanding resource channels

9.Propose alternative energy
10.Propose sustainable agriculture
13.Propose more efficient ways for saving resources
29.Obtain spare resources
31.Distribute resources
32.Preserve resources
48.Networking for food allocation
64.Increase temporary water resources

128 Advancing sustainable agriculture

10. Propose sustainable agriculture
13. Propose more efficient ways for saving resources
32.Preserve resources
46.Assuring maintenance of water and food reserves
64.Increase temporary water resources
82.Find new applications using less water

129 Increasing water reserves

11.Propose alternative water sources
13.Propose more efficient ways for saving resources
46.Assure maintenance of water and food reserves
64.Increase temporary water resources
72.Develop new farming techniques preemptively
73.Teach farmers new methods
75. Consider benefits of early farming techniques
77.Ration water usage
82
Find new applications using less water

130 Promoting water efficiency

13. Propose more efficient ways for saving resources
46.Assuring maintenance of water and food reserves
64. Increase temporary water resources
66. Implement technologies to harness rainwater
77. Ration water usage
82. Find new applications using less water

131 Conserving existing water supply

77. Ration water usage
78. Prevent water related disease
79. Network water supply chain

Activity Analysis

ACTIVITY

Community-Level Adapting

PROJECT Adapting to a hotter, drier world

MODE Coping /Short Term

ORIGINATOR Ido Mor

CONTRIBUTORS

SCENARIO

Due to the circumstances of dealing with unprecedented conditions, it would be inappropriate to assume that every factor of the system can be accounted for. Community-Level Adapting actively confronts the unexpected repercussions which may arise through the evolution of implementation.

USERS
- Citizens
- Agencies
- Agency workers
- Public relations personnel
- Project managers
- High-level decision-makers
- Local policy-makers
- Local industry

SYSTEM COMPONENTS
- Telephones
- Computers
- Data storage devices
- Paper
- Fax machines
- Photocopy machines
- Office work space
- Internet

ENVIRONMENTAL COMPONENTS
- Business offices
- Industrial complexes
- Virtual realm (internet)
- Local convention center
- City hall

SYSTEM FUNCTIONS	ASSOCIATED DESIGN FACTORS
Assuring maintenance of water and food reserves	Reserves are depleting faster than can be refilled
Rationing water usage	Water users ignore rationing notices
	Lack of infrastructure to enforce rationing
Promoting rainwater collection systems	Systems can be expensive to install
Networking for food allocation	Government refuses to subsidize collection systems
	Shortage of food to meet regional needs

Activity Analysis

ACTIVITY

Sustaining Food/Agriculture

PROJECT: Adapting to a hotter, drier world

MODE: Coping

ORIGINATOR: Margo Horowitz

CONTRIBUTORS

SCENARIO

The rise in global temperatures will increase crop yields in temperate northern regions while harming agriculture in tropics, further widening gap between industrialized and poor nations. A system will be implemented to ensure food sources are available and agriculture continues to provide sufficiently for communities.

USERS

Citizens
Farmers
Environmental experts
Scientists
High level decision makers

SYSTEM COMPONENTS

Farming methods
Land
Water
Irrigation systems
Farming tools/machines
Technology
Livestock

ENVIRONMENTAL COMPONENTS

Field locations
Farms
Laboratory
Test greenhouses

SYSTEM FUNCTIONS	ASSOCIATED DESIGN FACTORS
72. Develop new farming techniques preemptively	New techniques are not easily integrated
73. Teach farmers new methods	Farmers unable to supply enough food
74. Network for food allocation	Insufficient resources available to enforce regulations
75. Consider benefits of early farming techniques	Farmers not eager to change their methods
76. Implement regulations to insure efficient use of resources	Bureaucracy limits policy implementation

Solution Element

TITLE

Urban Agriculture

existing
modified
speculative

SE-1

PROJECT	Adapt to Hotter, Drier World
MODE	Coping
ACTIVITY	Sustainable Food / Agriculture
ORIGINATOR	CJ Chou

DESCRIPTION

Agriculture products imported from conventional farms, will be severely damaged by hotter and drier conditions. For cities that rely heavily on the affected crops, Urban Agriculture introduces local agriculture economy in urban areas to help cool the buildings as well as secure food supply in the city.

CONTRIBUTORS

SOURCE

http://www.climatecrisis.net/takeaction/whatyoucando/index4.html
http://www.sciencedaily.com/releases/2005/07/050714004407.htm
http://yosemite.epa.gov/OAR/globalwarming.nsf/content/ImpactsAgriculture.html

PROPERTIES

- Green Roof Project is a policy that promotes growing vegetation of building-roofs in urban areas.
- Small-Scale Urban Farming is a policy that promotes growing organic foods on any small-scale available space or land such as garden, balcony or courtyard in urban areas.
- Large-Scale Urban Farming is an agriculture policy that promotes large-scale local organic farms in or close to urban areas.
- NewLand is a policy that promotes farmers to work for urban organic farms.

FEATURES

Help cool building-roofs and adapt to hotter temperature in urban areas.
Produce fresh organic foods for daily consumption.
Helps each family, building, community and the city to be more self-sufficient.
Use less water, less energy, reduce CO_2 emission for organic farming.
Promote sustainable agriculture in urban area.
Provide farmers whose land is suffering desertification with a second chance to work on agriculture.

ASSOCIATED FUNCTION/S

72 Develop new farming techniques preemptively
73 Teach farmers new methods
74 Network for food allocation
75 Consider benefits of early farming techniques
76 Implement regulations to insure efficient use of resources

SOURCE DESIGN FACTOR/S

18a Techniques too slow for implementation
18b Techniques too expensive for implementation
18c People do not want to change what they do
18d Insufficient resources available to enforce regulations

VERSION 1 DATE 27 October 05 DATE OF FIRST VERSION 27 October 05

Solution Element

TITLE

PowerOn

existing
modified
speculative

SE-2

PROJECT	Adapt to Hotter, Drier World
MODE	Coping
ACTIVITY	Sustainable Food / Agriculture
ORIGINATOR	CJ Chou

DESCRIPTION

Urban regions have a high risk of city-wide power outages when there are extremely hot temperatures. For those city residents, PowerOn applies both active and passive measures that secure basic power supply and help citizens cope with power outages in the city.

CONTRIBUTORS

SOURCE

http://en.wikipedia.org/wiki/Rolling_blackout
http://www.siemens.com/index.jsp?sdc_p=ft55mlsu20o1206598ni1206610pJ410cz&sdc_sid=31254378434&
http://www.iwantoneofthose.com/gorgeous-gifts/gifts-for-him/wind-up-multi-mobile-charger/index.html

PROPERTIES

- Power Suspension is a way to enforce districts in a designated city take turns to be of power outage.
- NightShift, ordered by government, is a period of days during which specific peoples need to work at night.
- Plug in Stand is a public facility powered by green energy, used to charge electric appliances and batteries.
- FeelIt is a public campaign to make citizens personally experience the impacts of hotter, drier conditions.

FEATURES

- Relief the crisis of accidental power outage in urban areas.
- Mitigate the peak of power demand during day time.
- Provide public with green powered charger just like a power vending machine.
- Make people experience hotter, drier impacts by enforcing them to turn off air conditioners and open windows for hours on designated days.

ASSOCIATED FUNCTION/S

68 Prevent power outage
69 Respond to emergency
70 Provide emergency power source
71 Provide portable power

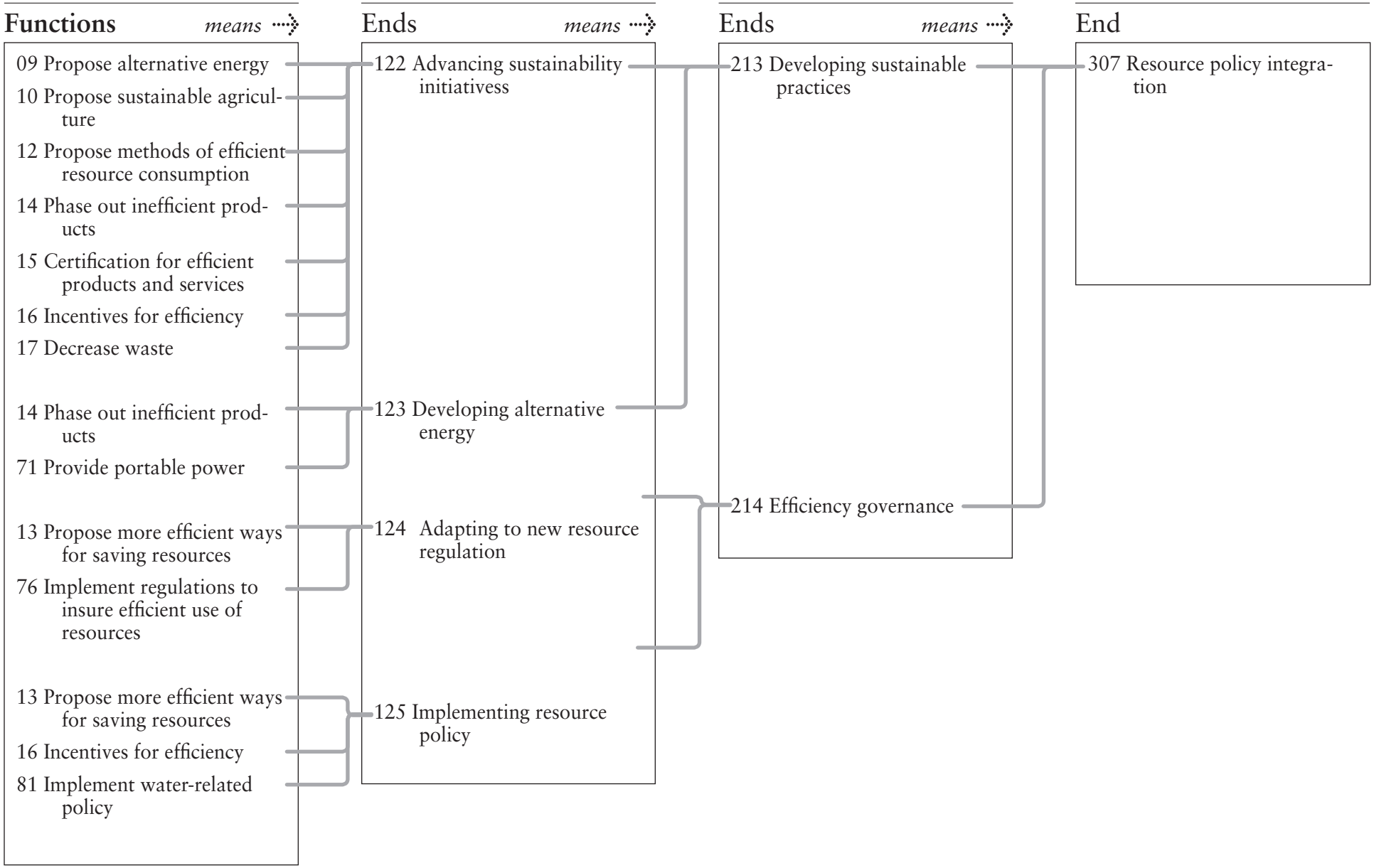
SOURCE DESIGN FACTOR/S

17a Useless new technology for current economic structure
17b Insufficient funding
17c No benefits or profits for the existing industry
17d Unable to change policy

VERSION 1 DATE 27 October 05 DATE OF FIRST VERSION 27 October 05

ProjectTitle Means/Ends Analysis

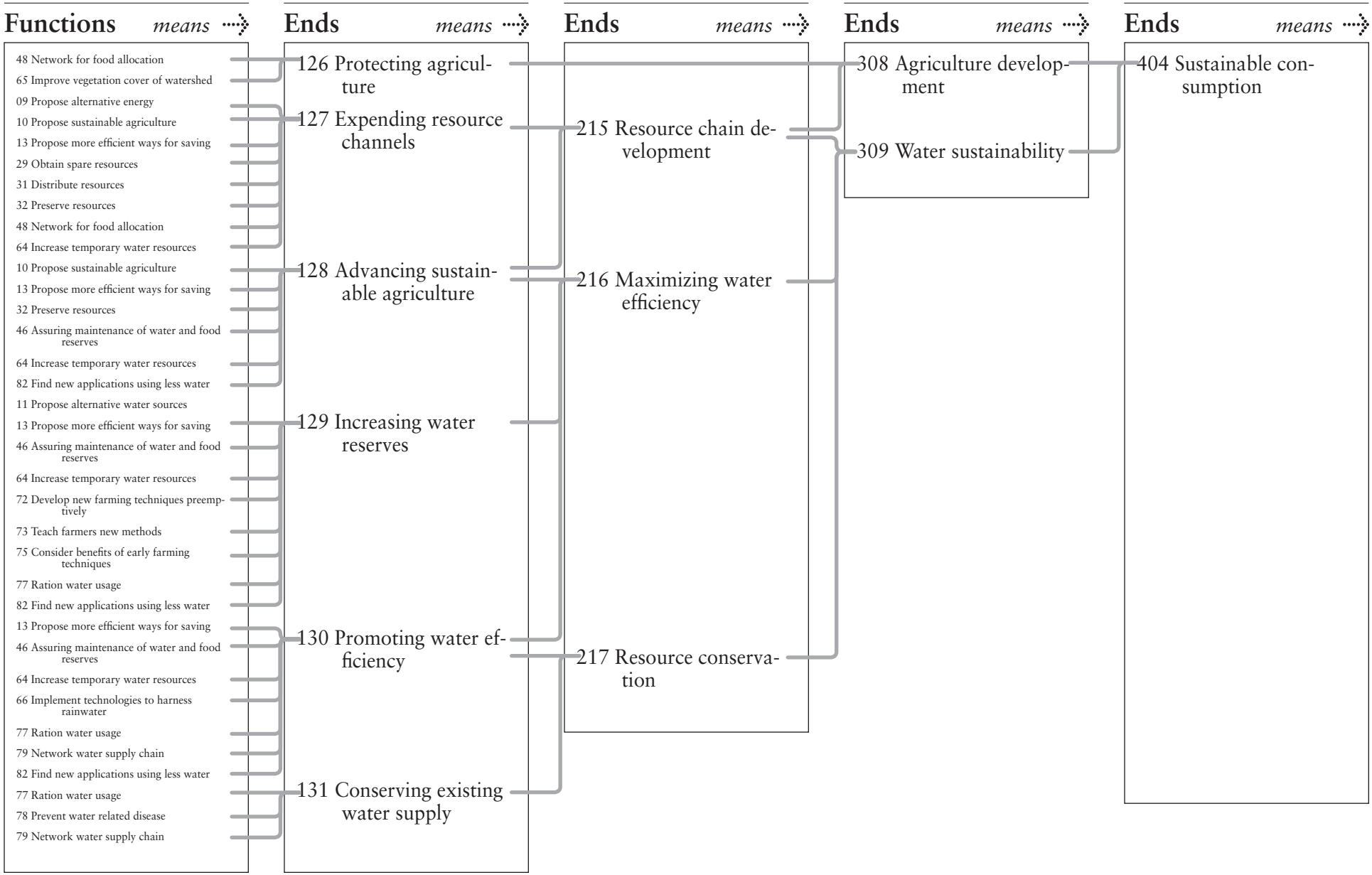
Cluster 307



27 October 2005 | Version 1

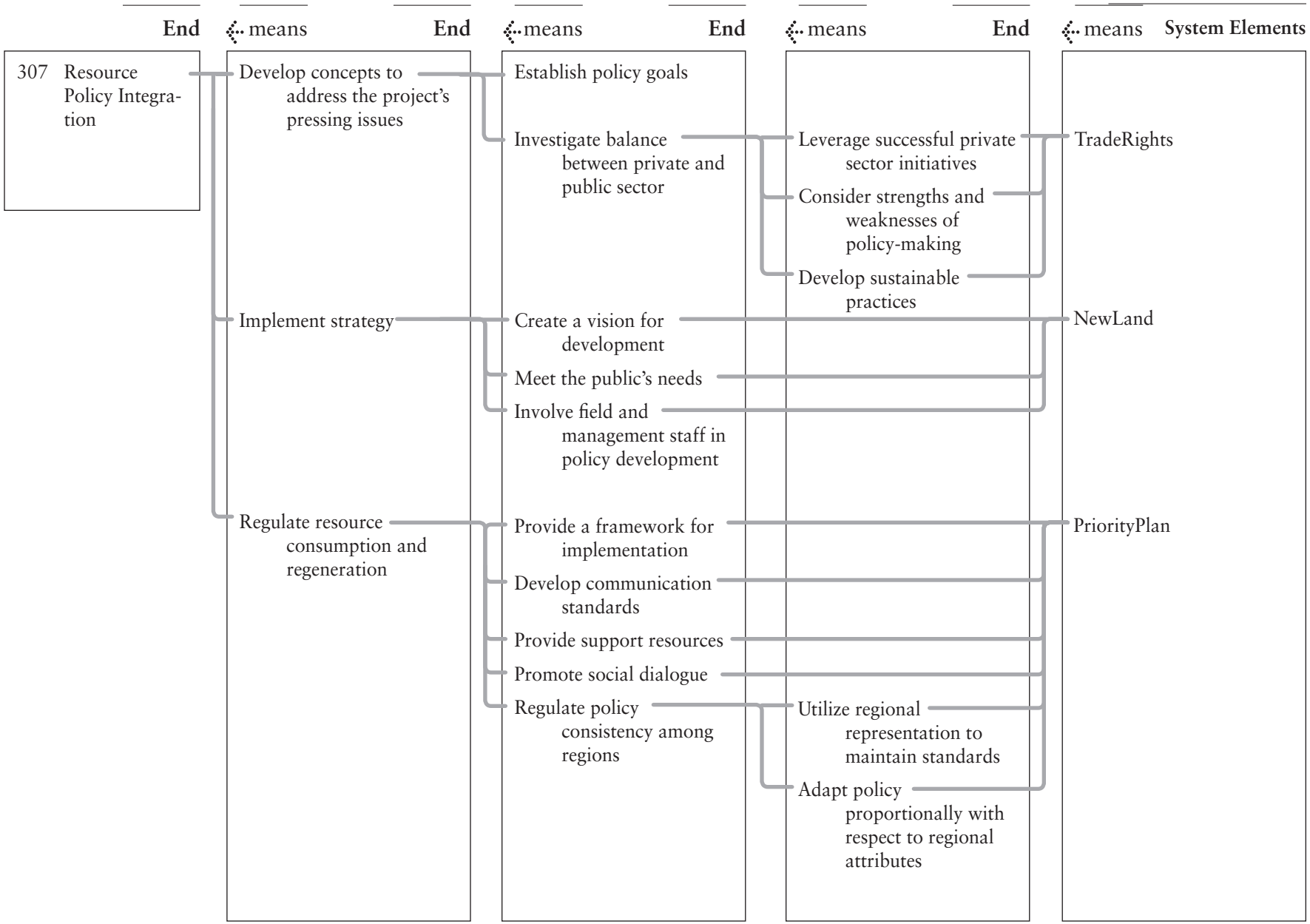
ProjectTitle Means/Ends Analysis

Cluster 404

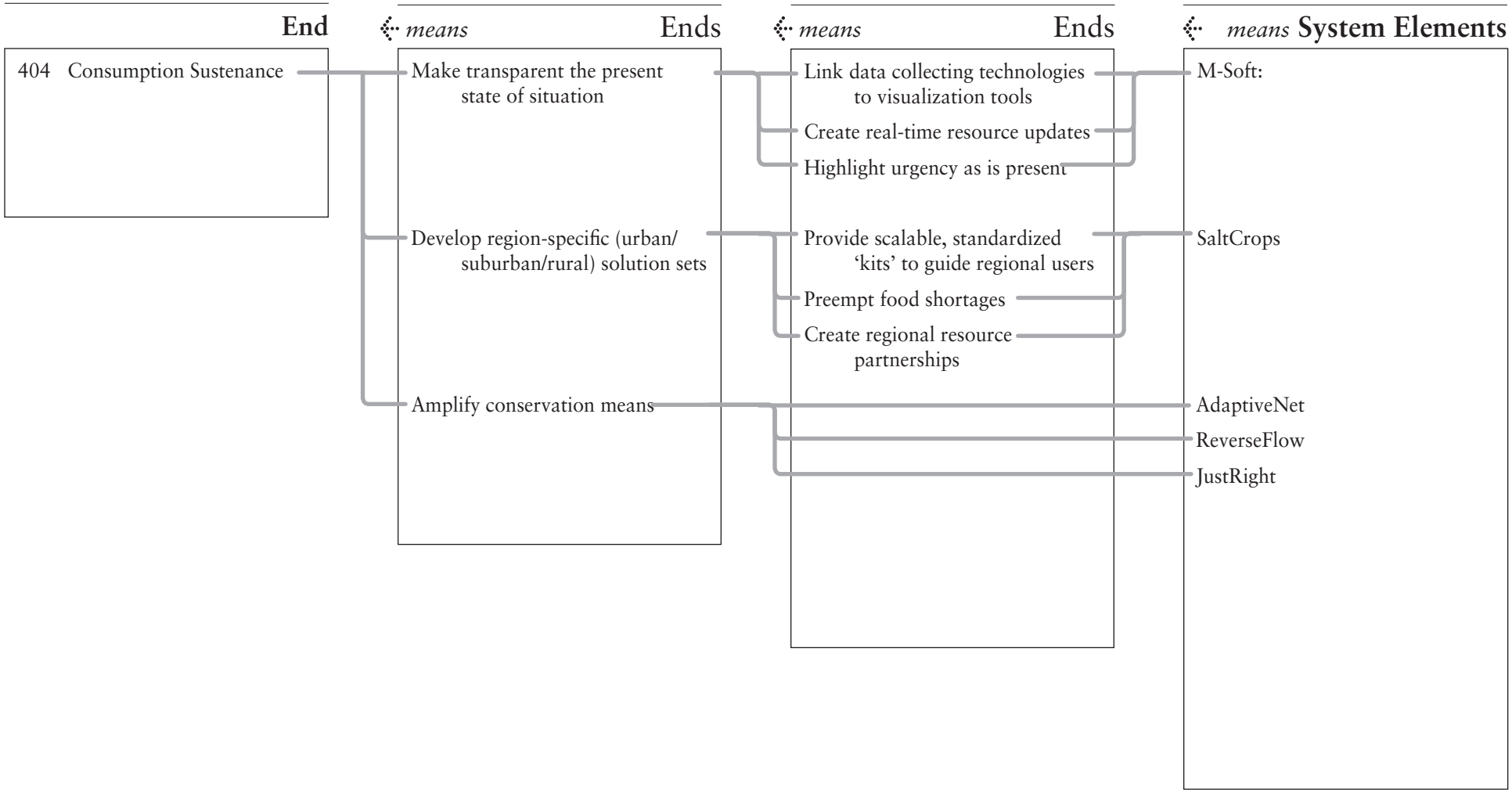


27 October 2005 | Version 1

Adapting to a hotter, drier world Ends/Means Synthesis Cluster 307



Adapting to a hotter, drier world Ends/Means Synthesis Cluster 404



Adpating to a hotter, drier world Feature/Function Matrix Cluster 301+302

System Elements	KTM Center			StandardFit			Train-ing		Proficient software		Flow	Think Tank				Hotter, drier Messenger											
Features	1	2	3	1	2	3	1	2	1	2	3	1	2	3	4	1	2	3	1	2	1	2	1	2	3	4	5
Functions																											
F1. Priortize coordinating scenarios	■	■									▪	■	■	■	▪												
F2. Collaborate investigation of resources		■	■	■	■	▪			■	■	▪		■	■	▪												
F4. Build communication networks	■	▪	■		▪	▪		▪	■	■	■	▪	▪		▪	■	■	■									
F5. Collect resource data	■	■	▪		▪	■	▪		■	■	▪		▪	▪													
F6. Code resource data		▪	■		■	■			▪	▪	▪	■	▪	■	■												
F21. Allocate funds for effected regions		▪	■																								
F34. Allocate tasks	■	■	▪	▪	▪	▪	▪	▪	■	■	■	▪	▪	▪	▪	▪	▪	▪									
F42. Allocate personnel to gather data	▪	▪	▪	■	■	■	▪	▪	■	■	■	■	▪		■	■	■	▪									
F50. Utilize local agencies to mobilize agen-	■	■																									

■ Strongly supports ful-llment of the Function ▪ Supports ful-llment of the Function

Adpating to a hotter, drier world Feature/Function Matrix Cluster 304

System Elements	HD Detecli-mate			HD AutoAlert			HD Alert																					
Features	1	2	3	1	2	3	1	2	1	2	3	1	2	3	4	1	2	3	1	2	1	2	1	2	3	4	5
Functions																											
F27. Issue timely alarm	■	■	■	■	■	■	■	■																			
F55. Alert community		■		■	■	■	■	■																			
F83. Issue extreme climate notification	■	■	■		■	■	■	■																			
F84. Issue heat wave warning	■	■	■	■	■	■		■																			
F85. Issue water shortage warning	■	■	■	■	■	■		■																			
F86. Issue food shortage warning	■	■	■	■	■	■		■																			
F87. Issue epidemic warning	■	■	■	■	■	■	■	■																			

■ Strongly supports ful-llment of the Function ■ Supports ful-llment of the Function

System Element Relationships

Hotter-Drier: System Element Type
System Elements Pairing 06 - 08 with 09 - 11

6 M-Soft	Farmers need to apply specific **SaltCrops** according to the drought warning issued by **M-Soft.** (3)	Farmers can apply **FarmInsure** to lease their land to research organization when **M-Soft** warns they will suffer drought. (2)		
7 TradeRights	After selling their water **TradeRights,** farmers need to apply specific **SaltCrops** due to less water consumption. (2)	After selling their water **TradeRights,** farmers can apply **FarmInsure** to lease their land to research organization for minimizing water (3)	**TradeRights** is essential for cities that apply **Urban Agriculture** that consumes a great amount of water. (3)	
8 SolarFarms	SolarFarms and SaltCrops are alternative solutions for farmers who is suffering drought or desertfication. (1)	**SolarFarms** and **FarmInsure** are solutions dealing with different severity of drought. (1)	Farmers who want to stay at their land should apply **SolarFarms.** Farmers who want to work in cities should apply **Urban Agriculture.** (0)	
	9 SaltCrops	10 FarmInsure	11 Urban Agriculture	

Scoring
3 Critical Relationship
2 Strong Relationship
1 Slight Relationship
0 No Relationship

System Element Relationships

Hotter-Drier: System Element Type
System Elements Pairing 18 - 20 with 21 - 23

18 JustRight	0	0 **JustRight** and **NuWater** are alternative solutions for saving fresh water.		
19 RainFlower Bed	2 **RainFlower** Bed can be applied with **Green Roof.**	3 **RainFlower Bed** provides water source to **NuWater.**	0	
20 Zebra Tops	2 **Zebra Tops** can be applied with **Green Roof.**	3 **Zebra Tops** provides water source to **Nuwater.**	0	
	21 Green Roof	22 NuWater	23 PowerOn	

Scoring
3 Critical Relationship
2 Strong Relationship
1 Slight Relationship
0 No Relationship

System Element

TITLE
AdaptiveNet

existing
modified
speculative

SE-10

PROJECT	Adapting to a Hotter, Drier World	SUPERSET ELEMENT/S	RELATED ELEMENTS Knowledge & Talent Management Center
ORIGINATOR	Ido Mor		
CONTRIBUTORS	Ethan Suh, Ming-Shan Wu		
SOURCE	•Strategy and the Internet, by Michael E. Porter •CNet.com •Shopping.com	SUBSET ELEMENTS InstallAssist AdapTruth Pest-Pedia GreenID JustRight	

DESCRIPTION

A web-based platform for disseminating tested, tangible solutions. Simplified access to a collection of comprehensive knowledge acquisition resources and tools that provide recommendations and direct access to proven methods and technologies.

PROPERTIES

- A web-based posting of solutions and technologies relevant to urban adaptation
- A resource for *'green technology'* installers
- A database of resource conservation tips and tools

FEATURES

- Provides exposure to proven solutions
- Reduces prices of green technologies through increased competition
- Enhances information value through user reviews
- Provides added value through installer listings
- Qualifies innovative solutions to resource conservation
- Generates convincing evidence as to *'green'* product effectiveness
- Links to Knowledge & Talent Management center to address the most pressing aspects of global warming

VERSION 2 DATE 10 December 06 DATE OF FIRST VERSION 30 November 06

FULFILLED FUNCTIONS
09 Propose alternative energy
11 Propose alternative water sources
13 Propose more efficient ways to save resources
32 Preserve resources
46 Assure maintenance of water and food reserves
64 Increase temporary water sources
65 Improve temporary cover of watershed
66 Implement technologies to harness rainwater
77 Ration water usage
78 Prevent water-related disease
82 Find new applications using less water

DESIGN FACTORS
01c Unable to notice changes in critical resources
01d Communication fails due to foul weather
03d Applying alternatives disturbs normal life
10a Unable to design educational materials
11a Information not thoroughly explained
11b Weak visualization to describe hotter/drier issues
16b Cost of implementation may be prohibitively high
17a Useless new technology for current economic structure
17b Insufficient funding
17c No benefits or profits for the existing industry
18b Techniques to expensive for implementation
18c People do not want to change what they did for generations

DISCUSSION

In an era of information overload we respond to clear, simple channels of information that minimize clutter and maximize benefits in our lives. **AdaptiveNet** is a centralized concentration of information relative to urban adaptation for a hotter, drier world. Acknowledging the busy nature of life in an urban context, it brings together proven methods and technologies to address issues ranging from resource consumption to disease prevention in response to expected and unforeseen effects of global warming. The **AdaptiveNet** platform is virtual, accessible by internet from any computer. Its resources can be accessed according to the specific area of urban setting required by the user, for example: home; work; outdoors, etc.

Since the needs of a European user will likely be quite varied from those of a North American user, individuals can create profiles and log-in upon each visit. In this way, featured information remains relative to region-specific needs – for example, a technological solution available only in European format, without UL listing, would likely not be offered to an American clientele. Likewise, a solution relating to disease carrying mosquitoes unique to African geographic conditions, unless proven to spread outwards, will not be offered to European clientele.

AdapTips

On one end of **AdaptiveNet** is a section called **AdapTips**. Here users will have access to a variety of information in the form of 'tips' to assist in changing their habits or introducing simple solutions to their environment in response to various threats. **AdapTips** are posted both by **AdaptiveNet** development teams as well as registered users. This recognizes the power of open networks in developing highly relevant and unexpected solutions to prominent challenges. It provides a voice for someone in a remote region to offer information on their adaptive methods that would have otherwise not had a platform to be heard.

Pest-Pedia

Pest-Pedia is one example of the type of information to be accessed through **AdapTips**. It plans for the foreseen implications where natural systems meet the urban context in circumstances resulting from global warming. As an illustration of the concept, in many regions of the world, shortened winters resulting from global warming make it easier for disease-carrying pests to survive into the spring. To address such a scenario, **Pest-Pedia** offers a collection of expert-researched adaptive methods, as well as recommendations through online postings by registered users. An incorporated feedback forum allows site visitors to rate solutions or provide opinions.

AdapTools

AdaptiveNet's secondary branch, **AdapTools**, serves to provide tangible, product-based solutions. In this forum, tested and proven technologies, from efficient cooling systems to water conservation devices, are made easily accessible to users. Partially due to low turn-over, the cost of green technologies is currently higher than that of comparable non-green products.

DISCUSSION (CONTINUED)

It is intended that through increased exposure and the consolidation of many distributors of sustainable technologies, raised competition levels and ease of accessibility to consumers will drive down prices of these technologies. In addition to this, and due to greater exposure, a more educated consumer market can then filter out less effective solutions and guide manufacturers to meeting real consumer needs. To facilitate this goal, aside from expert reviews published by **AdaptiveNet** development teams, registered users will be able to post reviews, opinions and replies regarding products they've purchased.

JustRight

An example of a product technology to be featured on **AdapTools** is **JustRight**. Research shows that millions of gallons of drinking water are wasted each year as people let their water flow while waiting for it to reach the right temperature for brushing teeth, washing dishes or taking a shower. **JustRight** is a digital temperature readout with heating elements to be installed directly into any faucet plumbing system. Users simply dial the desired temperature and turn the water on. The heating element mixes hot and cold water to precisely the desired temperature, cutting down on wasted water.

Green ID

A key benefit of **AdaptiveNet** is the content development teams and reviewers who approve all solutions proposed on the web platform. Working in close collaboration with the findings of the Knowledge Transfer Management (KTM) Center, **AdaptiveNet** researchers are able to propose only solutions that address the most relevant of challenges facing resource conservation and consumption, as well as adaptation methods. **AdapTools** and **AdapTips** demonstrating highest degrees of relevancy, efficiency and performance, are awarded the Green ID distinction, allowing them to stand out from the rest in online listings with increased exposure and 'featured' status.

InstallAssist

Since many solutions of adaptation to life in a hotter, drier world involve conservation and increased efficiency in resource consumption rates, it is expected that an extensive portion of solutions will relate directly to energy and water usage. As is the case with any technical product requiring complex installation, the general public tends more often than not to find such requirements as barriers to incorporation for homes or offices. Through **InstallAssist**, **AdaptiveNet** includes a listing of regional product installation specialists to assist customers through the implementation phase of complex technology solutions. Installers advertise their services on banners built into the website, and are ranked and reviewed by users following completion or product installations.

AdapTruth

Lack of justification for the high up-front costs of 'green technologies' has been a major barrier to their market success. AdaptiveTools includes a convenient graphing tool that visually displays customers' monthly expenditures on a given utility (i.e. water, electricity, gas), and overlays an 'expected deviation' to demonstrate over what duration of time customers can expect to see financial benefits for their up-front investments.

SCENARIO

It was another stinging, hot summer morning when Tom left home to catch the train for work. Even though it was just 8.30am, after walking a single block down the street Tom was already feeling beads of sweat forming on the back of his neck. Remembering just then that he has a meeting at 9.15 with one of his clients, Tom made a promise to himself to never again wear light colored shirts during the summer – how would he possibly have time to clean up the sweat patches before the meeting?

Boarding the cramped train, Tom barely stood, pressed between three men, all taller than him, meaning there wasn't much hope for fresh air in the stuffy train car. One stop before his office, two of the gentlemen standing before him got off. Just at this moment, staring him in the face was an advertising bill posted on the inside of the train, saying, "Feeling the sting of another hot train ride? Solutions for refuge await you at www.**AdaptiveNet**.com." Quickly, Tom pulled his

SCENARIO

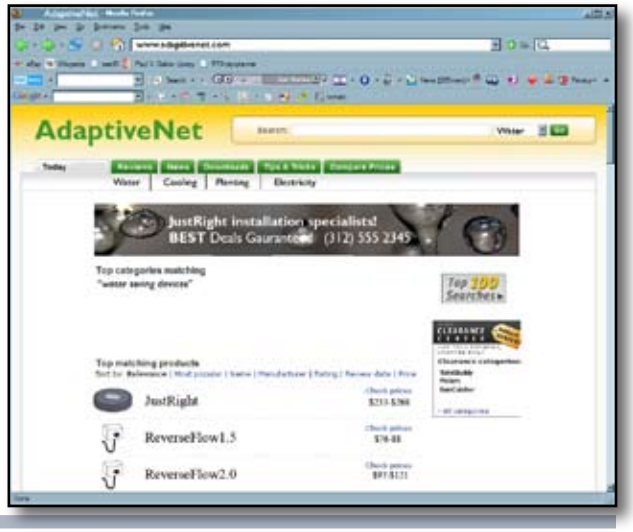
train ticket from his coat pocket and wrote down the information just as the train pulled up to his stop.

During his lunch break at the office that afternoon, Tom jumped on the computer to see what **AdaptiveNet** was all about. As the page uploaded he was prompted to log in or create a user profile. Selecting the profile option, Tom inputted: 'Home Country: United States > State: Illinois > City: Chicago'. The profiling tool continued, guiding Tom through a series of simple questions about his household size, the amount of time he spends at home each week, how many cars he owned, etc. The entire process took 5 minutes.

Now into the main page of the site, Tom read through the sections, "Water …Gas …Cooling …Planting …Electricity." He clicked directly to 'Cooling.' A featured AdapTool appeared, entitled 'Cool Wool' – a new engineered wool, designed to keep you cool and dry in hot summer heat. "Wow!" thought Tom, "Who would have thought wool could do this?" – this is exactly what he was looking for. The product detail went on to describe the qualities of the fine wool fiber and their benefits. Tom was excited. He would now wear light colors during the summer.

After completing the Cool Wool sweater transaction, Tom took a moment to explore the rest of the website. Scrolling through the 'Water' section, all sorts of thoughts came to mind. A product for water conservation appeared, called **JustRight**. Tom considered his last water and heating bill. Ever since the regional drought warning came into effect, water prices have been quite high. This product was awarded the Green ID recognition by the research and development teams of **AdaptiveNet**. Customer feedback gave it rave reviews, with 4½ out of 5 stars. Even with such wonderful reviews, Tom still wasn't convinced about the product – the price was so high! Then he saw the AdapTrue graphing of **JustRight**. It showed Tom's monthly water and heating bill with an overlay of the expected cost reductions over a 12-month period. Clear as day, it was now apparent that **JustRight** would begin to pay for itself after only 8 months.

Tom never decides on issues of domestic relevance without prior discussion with his wife. He called Kelly to tell her about the day's wonderful turn of events; from his sweaty train ride to discovering 'Cool Wool'. He told her all about **JustRight** and how it could begin to save them money on their utility bills. When she realized **JustRight** had to do with installation to their home plumbing, she put the brakes on the discussion, knowing full well her husband was far from a handy-man around the house. Meanwhile Tom, on the other end of the phone, glancing a second time at his computer screen, noticed an advertisement banner across the top of the page, reading, "**JustRight** installation specialists! Lowest prices guaranteed!" This sealed the deal – with a full-installation package made conveniently available with the purchase of the product, Tom and Kelly had the unit installed in their kitchen and bathroom sink as well as the main line for the shower.



System Element

TITLE
PriorityPlan

existing
modified
speculative

SE-10

PROJECT	Adapting to a Hotter, Drier World	SUPERSET ELEMENT/S	RELATED ELEMENTS TradeRights SaltFarms SolarFarms
ORIGINATOR	Ido Mor		
CONTRIBUTORS	CJ Chou		
SOURCE	•Fact Sheet on US Cotton Subsidies and Cotton Production, by Will Allen, February 2004 •Looking into the Sun, by David H. Freedman •UNEP: The Shrinking of the Aral Sea	SUBSET ELEMENTS M-Soft NewLand	

DESCRIPTION

A collection of tools supporting policy regulation to delineate global zones threatened by severe drought, accompanied by a series of alternative recommendations to accommodate variations in regional conditions.

PROPERTIES

- Remote-sensing satellite imaging technology
- Government sponsored initiatives supporting integration of rural sector workers to the urban sector
- Initiatives promoting trade of water priority rights to the non-agricultural sector
- Experimental field research development initiatives
- Micro-financing credit growth models
- Regulatory limitations on inefficient water usage

FEATURES

- Defines regions most threatened by drought
- Regulates water use efficiency through policy
- Charts soil moisture-content to support policy decision-making
- Proposes alternative solutions to farmers in water-stressed regions
- Provides grounds for advancement of adaptive crops
- Alleviates partial stress levels from strained water sources
- Develops market diversity among stagnant regions geared towards single-crop production
- Reduces percentage of environmental refugee relocation
- Provides security to efficient zoned agricultural sectors
- Models soil moisture content to guide policy-making
- Places barriers for inefficient sector development during drought
- Promotes water allocation to non-agrarian sector

VERSION 3 DATE 12 December 06 DATE OF FIRST VERSION 2 December 06

FULFILLED FUNCTIONS
09 Propose alternative energy
10 Propose sustainable agriculture
11 Propose alternative water sources
13 Propose more efficient ways to save resources
31 Distribute resources
32 Preserve resources
46 Assure maintenance of water and food reserves
48 Network for food allocation
64 Increase temporary water sources
65 Improve temporary cover of watershed
72 Develop new farming techniques preemptively
73 Teach farmers new methods
77 Ration water usage
82 Find new applications using less water

DESIGN FACTORS
02a Insufficient data on resources
03c Alternatives are located outside of system scope
05b Levels of severity not clearly defined
05d Insufficient data to define levels of severity
07e Unable to respond in time
08d Insufficient resources for local victims
15b Agricultural sector workers take a laissez faire approach
16b Cost of implementation may be prohibitively high
17a Useless new technology for current economic structure
17b Insufficient funding
18a Techniques too slow for implementation
18b Techniques to expensive for implementation
18c People do not want to change what they did for generations
18d Insufficient resources available to enforce regulations

DISCUSSION

Agricultural development in geographical world regions is not currently controlled under policy regulations – that is to say that the agrarian sector can choose what to grow and where to grow it, regardless of whether selected crops are appropriate for their respective regions. The fact that 93% of the world's annual consumption of drinking water is utilized by this sector each year, according to a United Nations Environmental Program (UNEP) study from 2004, highlights the urgency of addressing efficient agricultural water management as global warming impacts bring increased stress to water supply.

Many studies have been conducted in the US and around the world, to quantify the amount of water needed to grow various crops. These studies have shown that, for example, on average 155 liters of water are used in the production of 1 kilogram of beef in the US. Acknowledging such statistics, we can begin to consider the effectiveness of raising cattle in some of the world's hottest, driest regions. Having proven such statistics, it is surprising then that there has been little done to effectively regulate the crops that can be grown in threatened regions, and furthermore that crops such as cotton – a large consumer of water and one of the most toxic agricultural products (due to pesticide use) – is still subsidized by the US government as the largest world exporter of cotton.

An case demonstrating impacts of inefficient agriculture has been well documented in Uzbekistan at the Aral Sea. This body of water has been studied extensively over the past 50+ years as it reduced from being the 4th largest lake in the world, to a minute fraction of its original self. What once fueled an enormous export fishing economy has since desertified, reducing the sea's fish population so drastically that the industry can no longer exist. Regional economy has since shifted to cotton since the country is the 2nd largest exporter in the world. In these years of change, thousands of regional inhabitants have been forced to migrate elsewhere in search of work, food and water.

The Aral Sea, while it is slowly making a comeback in the northern Kazakhstani side, is still suffering greatly in the southern Uzbekistani side. It is just one in dozens of similar scenarios playing out in China, Niger and Cameroon in West Africa, and many other global regions. It serves as a model for the far-reaching impacts of desertification, causing drastic shifts in socio-economic structures leading to the subsequent migration of a new kind of refugee, referred to as 'Environmental Refugee'.

In response to these circumstances, the role of **PriorityPlan** is first to establish a drought threat severity scale. The severity scale objectively quantifies degree of threat based on available water for the essential purposes of the domestic, industrial and agricultural sector of a given region. As drought develops and water becomes scarce in the designated region, priority of usage relatively shifts to assure no interruptions take place in serving the region's essential and critical functions.

DISCUSSION (CONTINUED)

In this respect, **PriorityPlan** implements safeguards for water allocation, promoting efficiency among the most stressed regions of land by securing rights to water only for those within the sectors who optimize their water usage in accordance with proven industrial or agricultural standards. By designating regional drought severity threat levels in conjunction with a list of acceptable uses for the varying degrees of severity, the governing body overseeing enforcement of **PriorityPlan** does not need to exert regulatory force on an ongoing basis, but rather more effectively, to divert water away from inefficient uses only during times of drought. The looming uncertainty of non-sustainable access to water by inefficient players in the agricultural and industrial sectors is therefore expected to induce shifts in certain industrial and agricultural producers, to more efficient designation of land-use by farmers who would otherwise continue growing cotton or raising cattle where resources are scarce.

Helping to define zoning allocation of **PriorityPlan** is a soil moisture content scanning technology called **M-Soft**. This remote sensing technology compiles satellite generated earth density scans with a secondary level of data gathered on storm movements throughout the year. An algorithm merging the two sets of data then models annual water expectancy in relation to predicted flows into underground aquifers, illustrating a graphic mapping of water content in underground stocks. In this manner we can better illustrate regional water availability and devise accurate prioritization plans as to the regions that are well-off with an abundance of water, versus those which are likely to suffer from the impacts of drought.

Accompanying implementation of **PriorityPlan** is a series of alternative propositions available to farmers and industry in cases where inefficiencies exist in regions designated for 'high threat'. These include:

TradeRights: State-promoted initiatives encouraging the trade of water priority rights between riparian landowners and surrounding non-agricultural communities who otherwise require the construction of large, costly reservoirs to collect sufficient drinking water to meet state-code requirements.

SaltFarms: Leasing agreement between laboratories developing crops for hotter, drier regions, and land-holders in regions with rising water salinity levels. Farmers are able to lease their land for testing and development of crops adaptive to the harsh conditions of hotter, drier and saltier regions. Crops yielded are then sold by the farmer. Due to the unpredictable nature of testing, the percentage of the fields which do not produce a yield, are then insured by to the farmer by the leasing company/laboratory.

SolarFarms: Shifted agricultural model moving from the farming of inefficient crops in hot, dry climates, to harvesting of the sun to create energy for sale back to the electric grid. At times this model can be developed in conjunction with specific types of traditional agriculture crops. In hotter, drier regions, where intensity of sun is plentiful the majority of the year (which is likely the cause of water evaporation affecting irrigation challenges) an economic model may be appropriate for the development of a solar farm. In developing regions of the world, communities may gather collectively to establish credit for accessibility to micro-loans in order to begin investment in the purchasing of solar photovoltaic panels.

NewLand: Government-sponsored initiative offering to relocate rural sector farmers in nearby urban cities, utilizing their skills and experience for the development of urban agriculture projects both in city-gardens and private citizen rooftop gardens. This increases self-sufficiency of the urban sector, maximizing rainwater runoff use while alleviating from the pressures of the rural agricultural sector to provide large yields under the increasing water resource stresses of a hotter, drier world. In addition, **NewLand** provides farming families the ability to access a wide variety of educational growth opportunities.

SCENARIO

Farmer John is a fourth generation cotton farmer living in West Texas along the Colorado River. Since his childhood days helping out his father during harvest times, John was always involved in some way or another with the work around their family farm. Now into his fifth season on his own land, John's gotten fairly comfortable managing operations of the dozen or so employees that help keep things running smoothly. This season they are very hopeful some fresh rains will come through and slightly cooler temperatures since the previous year's drought wiped out so much of their crop yield.

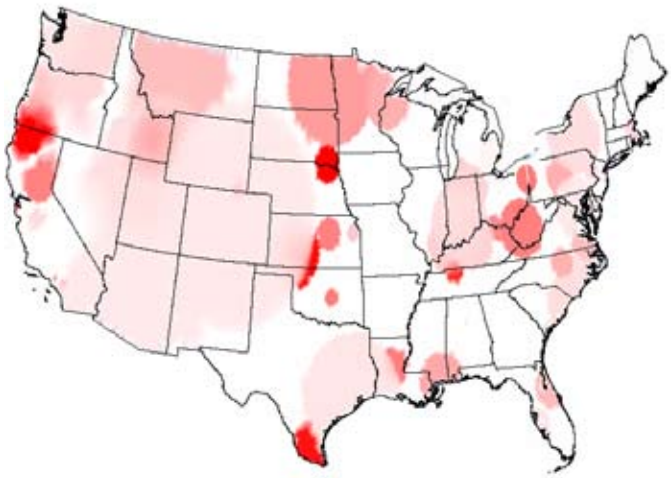
One Tuesday afternoon, taking a break from an extended morning haul John sees the mailman, Tom, approaching. Tom doesn't appear his usual cheerful self. He's carrying a large envelope with him. John notices Tom's mail-cart with more of these identical large envelopes in the distribution packets to the rest of the cotton farmers in the area. As he approaches, John takes the envelope from Tom's hand. It's post-marked from the United States Department of Agriculture (USDA). The two men exchange glances, as Tom clenches his lips just before saying, "Looks like **PriorityPlan** has finally been approved. I'm sorry John. The whole community's a bit on edge today."

In fact, with so much talk in the news over the past several months about the USDA **PriorityPlan** initiative, John was quite ready for this letter to come any day – it was just a matter of time. Reviewing the letter closely, John studies an enclosed image entitled, **M-Soft** - Soil Moisture Content Mapping. Right before him he sees a graphic depiction of his land from an aerial photograph. There is a light yellowish-orange wash of color directly over his cotton farm. The key to the right indicates moisture content in the soil, ranging from Green to Blue, then Yellow, all the way to a deep Red. Red is marked as 'Severe Drought Threat,' while Green, on the bottom is marked as, 'Low Drought Threat.' The condition of John's land falls directly in the center at this point.

The letter states that John's farm is located, "in an area prone to severe drought due to decreased rainfall, increased farming impacts on the resources from irrigation of cotton farm expansion, and a growing regional population." Needless to say, John could have told them of this ages ago – his father began having problems with crop yield years back, but the family down-sized their employees and farm size, and survived since with some heavy subsidies from the government. In fact, the whole cotton farming town relies on these subsidies in order to make ends meet – it's the only way to put food on the table.

John is faced with a very difficult decision. If he chooses to continue farming cotton on this land and another drought should occur, his property will be on the list to lose priority rights to their water. The entire crop would be affected and no subsidies would help them then. The costs of shifting to another form of agriculture would be enormous! Somewhere half-way down the letter though, it states that the government will be offering financial assistance to those choosing to change their crops for those proven to be 'efficient drought-zoned agriculture'. In addition to this are several other options listed, including **TradeRights**, **SaltCrops** and **SolarFarms**, offering a variety of solutions that will be discussed in a town-hall meeting at the end of the month.

PriorityPlan Drought Zone Designation



No Drought  Severe Drought