



REVIVA

INTERNATIONAL
GROUP

PRESENTS

**THE GREEN
DESERT
PROJECT**

**THE LARGEST ENVIRONMENTAL PROJECT
IN WORLD HISTORY**

JANUARY 2009

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PRE-PROJECT VISION

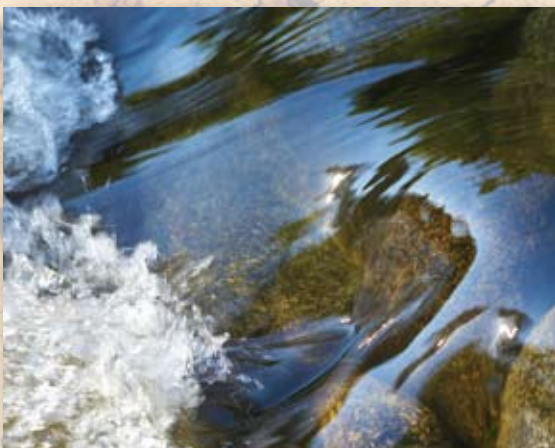
Vegetation growth on the vast desert expanses of the Kingdom of Saudi Arabia, shall be encouraged by

- providing water acquired by atmospheric water harvesting;
- new and relatively cheap technology of sea water desalination based on solar energy utilization;
- new technology of urban waste water reclamation.

Soil fertility improvements will be achieved by supporting the natural processes of vegetation development, especially by the natural sequence of universal landscape components using a wide diversity of plants and animals.

Climate moderation and improved **water circulation** is foreseen as well due to evaporative cooling.

Programs will take into account the social, financial and biological ramifications of technologies, changes and suggested practices.



TIME SCHEDULE OF THE PROJECT

PROPOSED PHASES OF THE GREEN DESERT PROJECT

2009

Preparatory phase

Elaboration of the project proposal by project team, presentation to Saudi Arabian government.

2010 – 2015

Introductory phase

Introductory phase of the project shall involve preparation and implementation of measures aimed at small water cycle renewal, increase of vegetation cover and cooling of selected pilot regions and watersheds of Saudi Arabia.

- completing of appropriate institutional structures
- technological capacities
- research and monitoring capacities
- promotion of educational activities
- international co-operation and integrated territorial information system
-

2016 – 2040

Adaptation measures and water policy change

Adaptation measures shall be implemented across the board in all significant regions and watersheds of Saudi Arabia.

2041 – further

Consolidation phase

Renewal and saturation of small water cycle shall be promoted in all significant regions and watersheds of Saudi Arabia.



PROJECT CORE TEAM

All the team members are worldwide acknowledged experts who are pioneers of the new view of dynamism in comprehensive system studies such as soil – nutrients – water – vegetation – energy – climate.

Each of the individual team members provides a unique and mutually complementary expertise and technology.

The approach of each of the partners is based on mimicking and recovering the functioning natural processes and systems as well as holistic and sustainable management. Each individual approach has been applied and proven in practice, often in difficult climate environments.

The combination of wisdom and experience these team members shall bring together synergistically represents a completely new quality in revitalization of deserts.

- NGO People & Water
- Seawater Greenhouse
- Watergy
- Natural Sequence Farming
- Holistic Management
- Permaculture



PEOPLE & WATER

“Awarded by the Goldman Environmental Prize”

www.waterparadigm.org, www.peopleandwater.sk

Humanity, through deforestation, agriculture and urbanization accelerates the runoff of rainwater and drains the land. “Hot plates” humans create so cause breakdowns in the stable water cycle, rise in climatic extremes, more frequent flooding, longer droughts, extreme heats, forest fires, drop in groundwater reserves, decrease in soil fertility and biodiversity. However, the impact can go in both directions.

The part of climatic change, which is the result of human draining of a land, can be stopped and renewal of a healthy water cycle achieved by comprehensive program of rainwater harvesting, conservation, infiltration and evaporation.

Organization profile

Non-government organization People and Water was founded 15 years ago. Its activities involve

- processing Alternative Water Management plan for Slovakia (1993 - 94);
- concept Stop Drying of Slovakia (1998 - 2000);
- concept of sustainable city water management Kosice Water Protocol (2005);



Mr. Michal Kravčík (right) presents Water Paradigm publication elaborated by him and his NGO People and Water team to the Prince Philip, Duke of Edinburgh (left, 2008).

- several programs of alternative water resources creation and increasing water retention in natural ecosystems 1995 - 2008);
- and educational activities like School of Regional Development (2007 - 2008) and People’s University of Water (2007 - 2008).



Mr. Michal Kravčík with Hillary Clinton (centre) - official welcome at the occasion of the Goldman Environmental Prize delivery (1999)



The most significant international activity in the late period was release and spreading of the publication “Water for the Recovery of the Climate – A New Water Paradigm” in 2007 of which Mr. Michal Kravčík and Mr. Jan Pokorný are key co-authors. Book sheds a new light on the relationships of the water cycle and energy flows in nature.

Achievements

- 2nd Prize of Sasakawa Environmental Prize (1994)
- Environmental Partnership Award (1995)
- 1st Prize of Sasakawa Environmental Prize (1997)
- EU - US Democracy and Civil Society Award (1998)
- Goldman Environmental Prize – presented to Mr. Michal Kravčík (1999)
- Golden Biatec Prize – presented to Mr. Michal Kravčík (2008)
- National Energy Globe Award (2008)

Key experts

Mr. Michal Kravčík, a holder of the Goldman Environmental Prize, worked for the Institute of Hydrology and Hydraulics and the Institute of Ecology of the Slovak Academy of Sciences. He is the founder of the People and Water NGO and its most prominent representative. His focus is on a small water cycle recovery.

Mr. Jan Pokorný is the director general of the beneficial society ENKI, a scientific staffer at the Institute for Systems Biology and Ecology of the Academy of Sciences of the Czech Republic, the co-author of a number of patents, a university lecturer, a member of the international scientific panel of the Natural Resources Commission for the Australian government.



Mr. Kravčík receives congratulations related to water programs implemented by NGO People and Water from Tony Blair, former Prime Minister of the United Kingdom(1998).

Role in the project

Water Paradigm team of Mr. Michal Kravčík and Mr. Jan Pokorný will provide crucial insights into water and energy balance necessary to achieve desired goal of restoring healthy water (and nutrients) circulation over regions of Arabian Peninsula in all its complexity, which includes increased soil moisture, promotion of sustainable vegetation growth, evaporation of water through vegetation, cooling, condensation and return of the water by rain, dew and fog on wider and wider areas of Saudi Arabia.



SEAWATER GREENHOUSE

“Probably the lowest cost method of desalination”

www.seawatergreenhouse.com

The Seawater Greenhouse is a unique concept which combines natural processes, simple construction techniques and mathematical computer modeling to provide a low-cost solution to one of the world's greatest needs – fresh water.

- Scheme of water production and subsequently food and renewable energy production is especially suitable to hot and arid regions and can be applied as a tool of re-vegetating areas of desert as well.
- Highly efficient synergies are achieved if technologies of the Seawater Greenhouse and Concentrated Solar Power are combined.
- Concentrated Solar Power is one of the most promising forms of renewable energy, producing electricity from sunlight. Seawater Greenhouse has demonstrated the potential to create surplus freshwater from seawater and provide ideal growing conditions in arid regions.
- It may also become the lowest cost method of desalination and perhaps the only one that is truly sustainable.

Organization profile

Seawater Greenhouse Ltd. was established in 2000. However, project dates back to 1991 when the concept was first researched by Light Works Ltd.

- The first pilot project commenced in 1992 on the Canary Island of Tenerife where results validated the concept.
- New design has been tested and validated on Al-Aryam Island, Abu Dhabi, United Arab Emirates in 2000.

In both cases, crop production in terms of quality and quantity has been outstanding.

In 2004 the completion of a pilot Seawater Greenhouse



Mr. Charlie Paton, inventor of the Seawater Greenhouse and of other significant innovations.

near Muscat, Oman was visible. In collaboration with Sultan Qaboos University, this exciting project will provide an opportunity to develop a sustainable horticultural sector on the Batinah coast. It will help reclaim abandoned agricultural land where soil and water salinity have reached levels at which crop production is not viable.

The Seawater Greenhouse concept is not limited to agriculture and may readily be adapted to the built environment. Project integrating cooling and distillation is currently designed for redevelopment of the harbour area of Las Palmas de Gran Canaria.

Key experts

Mr. Charlie Paton studied at Central School of Art and Design in London. He is the inventor of the Seawater Greenhouse and a number of other groundbreaking innovations. Starting with an experimental pilot in Tenerife, he has designed and built two further Seawater Greenhouses in Abu Dhabi and Oman.





The Seawater Greenhouse won eight prestigious awards including

- Design Sense Award for sustainable design (1999);
- IET Institute of Engineering + Technology Sustainability Award (2006);
- St Andrews Prize for the Environment (2007).

Role in the project

The Seawater Greenhouse technology of Mr. Charlie Paton shall use seawater to cool and humidify greenhouses and to provide fresh water. The Seawater Greenhouse evaporates a great deal more water than it condenses back into fresh water. This humid air can significantly contribute to soil/air moisture outside greenhouses. Greenhouses which are scaleable, without limits on maximal size, evaporate around 5 tons of seawater a day from a 1000 m². Vegetation in the vicinity of greenhouses would be fed by this water vapor and encourage its condensation.

The Seawater Greenhouse uses very little electrical power. However, integrated with a Concentrated Solar Power installation it can even significantly increase the production of fresh water.



Photos of Charlie Paton's Seawater Greenhouse in Oman. Starting with an experimental pilot in Tenerife, he has designed and built two further Seawater Greenhouses in Abu Dhabi and Oman.



Charlie Paton is the author of the Sahara Forest Project, which is a scheme to provide fresh water, food and renewable energy in hot, arid regions as well as re-vegetating areas of desert. The scheme combines two established technologies – the Seawater Greenhouse and Concentrated Solar Power – to achieve highly efficient synergies.

WATERGY

“Urban zones new water management”

www.watergy.de

The Watergy project proposes the integration of greenhouses in urban areas in symbiosis with houses. The greenhouse is incorporated as part of a new humid air solar collector system in which the heat collection process allows for grey water purification.

The treatment of urban residual water in such an autonomous way, together with the collection of rain water, can be a basis for a complete autarky of water supply and wastewater treatment.

On the other hand, intensive agriculture can be freed from its enormous water consumption, increasing the sustainability of greenhouses, which are able to produce distilled water as well as fruits.

Organization profile

Watergy project is funded by the Fifth European Community Framework in its Energy, Environment and Sustainable Development programme.

A combination of evaporation and condensation allows to use solar thermal energy in a much more efficient way. The main advantage is the reduction of costs in space cooling and heating, possibility of water purification, as the system can be fed with low quality water to obtain distilled water.

Watergy is winner of the Spanish Ricardo Carmona Award for the best scientific work 2007.

Key experts

Mr. Martin Buchholz submitted Master thesis about sustainable landscape development in the urban perimeter of Berlin (Award of German Horticultural Society). He is

- the inventor and founder of the Watergy system;
- coordinator of the EU project Watergy (2003 - 2006);



Courtesy of Marco Schmidt

- coordinator of the EU project Cyclus Support (2006 - 2008) that worked on integrated landscape development, based on combined intensive crop production (new generation greenhouses) and extensive production (rainwater harvesting, use of unconventional water) in combination with urban closed water and matter cycles.

Mr. Marco Schmidt works at the Technical University of Berlin, Germany on water balance modifications in urban areas, esp. evapotranspiration and evaporative cooling systems, rainwater management of pavements, lysimeter measurements, roof greening and rainwater harvesting projects.

- **Mr. Martin Buchholz and Mr. Marco Schmidt** are pioneers of sustainable water management in urban zones, air conditioning of buildings by unconventional evaporative systems, as well as of the concept “Watergy”, a closed greenhouse type with evaporation and condensation processes,



working under scarcity conditions with non conventional water resources.

Role in the project

Large volumes of waste water in urban zones represent an opportunity of treating, recycling and reusing it. The use of evaporative cooling systems in buildings based on the use of water is the cheapest and most effective way to cool a building.

- Water used for evaporation in urban areas shall decrease the surface temperatures and increase the condensation process as well as the precipitation rate.
- “Watergy” technologies fed with low quality water to obtain distilled water shall be used to improve the soil and to generate income by high quality crop production.



Mr. Martin Buchhloz is the author of Watergy prototype greenhouse built in Almería, Spain (photo), as well as the patent. Next to reduction of costs in space cooling and heating, the system can be fed with waste water to obtain distilled water.



Constructions designed by Watergy Group are easy adaptable to various urban situations.

NATURAL SEQUENCE FARMING

“Best land and water management in the world”

www.nsfarming.com

The Australian landscape functioned efficiently and sustainably in the past when plants were in charge.

- Plants controlled and kept in check all the things that affect the health of the landscape, fertility and salinity among them.
- Plants moderated the extremes of temperature in any area from night to day, influencing where the rain fell as well as the climate.

Current land and water management problems are direct results of the loss of vegetation. Plants need to be growing in large numbers again. Weeds are the key to a landscape's fertility. They grow rapidly and produce a large bulk of organic matter, both above and below the surface and open door for other plants so.

Organization profile

Natural Sequence Farming (NSF) is a rural landscape management technique aimed at restoring natural water cycles that allow the land to flourish despite drought conditions. NSF offers a low-cost, widely applicable method of reducing drought severity and boosting productivity.

The technique is based on ecological principles, low input requirements and natural cycling of water and nutrients to make the land more resilient.

The important elements of NSF in improving soils are:

- maintaining good vegetation cover,
- mulching organic matter to improve soil structure,
- maintaining a diversity of plants including deep-rooted species,
- diverting water into floodplains to increase its residence time in soils,

- structuring streams to reduce flow velocities,
- using structures in streams to provide productive flow form patterns in freshes.

NSF can do what mineral fertilizers cannot do - produce a functional soil. A diversity of plants is encouraged by NSF succession approaches using grazing, slashing and mulching to produce a resilient system with essential elements. Certain patterns can help produce new soils through the deposition of sands, clays and organic matter on the floodplain while protecting the lush vegetation already there.

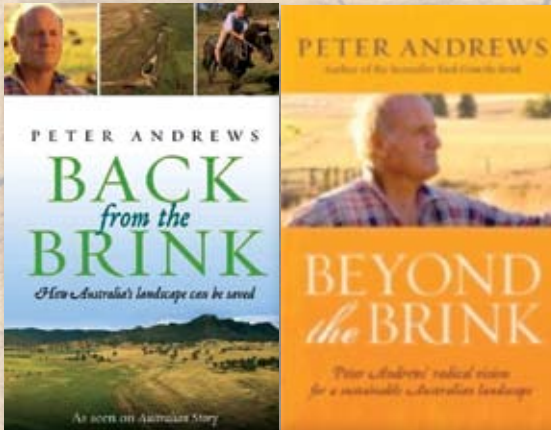
Key experts

Mr. Peter Andrews (Australia) received the accolade of best land and water manager in the world at the 2nd International Conference of Ecological Engineering held in China. He has gained fundamental insights to the natural functioning of the drained Australian landscape through a lifetime of observation and



Mr. Peter Andrews, a man working with nature to restore balance to Australian landscape tortured by droughts.

experimentation. He has applied these insights in restoring his and other properties to fertility levels that allegedly exceed those which existed before European arrival in this country.



Book "Back from the Brink" (2006) written by Peter Andrews became national bestseller in Australia. At the end of 2008 was released the sequel "Beyond the Brink."



His Excellency, The Governor-General of the Commonwealth of Australia, Major General Michael Jeffery (first from the left) and Peter Andrews (middle in the front row) inspect farming practices at Mulloon Creek Natural Farm, Bungendore, NSW, Australia, 2008. Governor-General praised "outstandingly innovative work of Peter Andrews" at this occasion and put it in the attention of government.

Role in the project

Efforts to increase soil moisture shall be combined with efforts of Natural Sequence Farming to encourage vegetation growth, especially in areas heavily affected by salinity and in desperate need of enhancing fertility.



HOLISTIC MANAGEMENT

“On 30 million acres worldwide”

www.holisticmanagement.org

Holistic management provides a goal-setting, planning and decision making framework that will help the Saudi government and those who are working to restore the desert ensure that the actions they choose to implement on the ground will - in fact - restore the natural systems - and will do it in a way that is also financially and socially sound.

This restoration methodology uses the livestock available to the people as the key tool to restore the landscapes. It thus reduces (and in most cases eliminates) the costly approaches that are heavily dependent on imported seed, equipment, imported fertilizers and irrigation systems (temporary or permanent).

Organization profile

Holistic Management (HM) works for 25 years with people around the world on 30 million acres to heal damaged land and increase the productivity of working lands. By healing the earth's desertified lands, and by managing healthy land in concert with natural processes, HM can repair malfunctioning ecosystems while achieving a “triple bottom line” of economic, environmental and social sustainability.



Results of Holistic Management methods in New South Wales, Australia. Holistic management approach is applied on greener right side of the landscape. Taken during severe 2006/7 drought.

HM has developed an approach to the restoration of grasslands that is the only known approach that is restoring vast acreages of grassland, rangeland, dryland areas of the world. This includes, also, documented evidence of restoration of the soils ability to hold increased water and of restored river systems.

HM has projects in the US, Canada, Mexico, Australia and Southern and Eastern Africa.

The most prominent customers were:

- U.S. Agency for International Development (USAID)
- World Bank
- U.S. Department of Agriculture
- US Department of the Interior
- The Kellogg Foundation
- The Ford Foundation
- The Hewlett Foundation
- World Vision Kenya
- Heifer International
- Mexico's Ministry of Natural Resources and Agriculture

Key experts

Mr. Alan Savory had begun working on the ancient problem of land degradation (desertification) in 1955 in Rhodesia, then subsequently as an independent scientist and international consultant. He wrote his discoveries about both the cause of desertification and how to reverse it using increased numbers of livestock in the book “Holistic Management: A New Decision Making Framework” (1989).

He founded the Holistic Management International, which nowadays works with people around the world to heal damaged land and increase the productivity of working lands in concert with natural processes.



Photo of Allan Savory (right) receiving the International Banksia Award in 2003 as the person “doing the most for the environment on a global scale”.



Corn yielded on adjacent properties in Zimbabwe (2008) with the same rainfall, same soils, no surface water, same native species on same day. The only difference was in management methods – holistic ones (left) versus conventional ones (right).

Role in the project

HM shall provide goal-setting, planning, decision making and monitoring tools which will result in a common agreed vision of the future, educating and engaging the citizens to restore the landscape at all levels. It will manage restoration to the natural systems – especially grasslands and secure increased productivity of agricultural lands.



healthy land.
sustainable future.

PERMACULTURE

“Restoring and reforesting in over 30 different countries”

www.permaculture.org.au

Permaculture (permanent agriculture) is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems.

It is the harmonious integration of landscape and people providing their food, energy, shelter, and other material and non-material needs in a sustainable way.

Organization profile

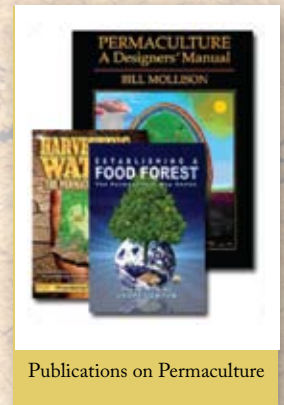
Permaculture is a worldwide movement promoting harmonious and sustainable design and land management.

The philosophy is one of working with, rather than against, nature. In the broad landscape permaculture concentrates on already-settled areas and agricultural lands. Almost all of these need drastic rehabilitation and re-thinking. Permaculture puts a great stress on ethical, responsible and sustainable treatment of the environment.

Key experts

Mr. Geoff Lawton (Jamal Al Deen) is the founding Director of the Permaculture Research Institute in Australia, having been requested to establish the institute by Permaculture movements founder Bill Mollison. Lawton has worked repairing, restoring and reforesting damaged

landscapes into fertile productive ones with the ecology design science of permaculture for clients that include communities, governments, aid organizations, non-government organizations and multi-national companies in over 30 different countries, Saudi Arabia including.



Publications on Permaculture

Role in the project

- Permaculture shall provide education of local population on vegetation, harvesting of water, decreasing run-off, desert garden and desert house design and ethical and sustainable design and maintenance of their environments. They will design and consult esp. management of settled rural areas.



Mr. Geoff Lawton (left), the founding Director of the Permaculture Research Institute in Australia with his father Geoff Lawton (Mustafa) at a conference.

