LEARNING for CHANGE AND INNOVATION

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Participatory Action Research for Long-Term-Social-Ecological-Research platforms

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LTSER Platform – the concept

• Long-Term Socio Ecological Research (LTSER) - hubs of interdisciplinary and transdisciplinary research, as part of a global research network

• LTSER Platforms feature three functional layers:
  • Physical infrastructure
  • Pro-active involvement of the research community on the regional, national and international level and,
  • Integrative management

The European network of LTSER Platforms represents entire regions in the senses of cultural, land-use, historical, natural, administrational and economic units, comprising all relevant agents.
Social-Ecological Coupled System

Social Template: Human Behavior
1. Culture, which is connected to the environment
2. Global Culture

Human Outcomes
1. Sense of place
2. Well-being
3. Alienation

Ecosystem Services
Fuel; fibers; food; water regulation; inspiration....

Pulses
1. Burning
2. Floods

Presses
1. Grazing
2. Tillage

External Drivers
1. Global warming
2. Global market changes

Defining Resilience
The social-ecological System, is able to absorb ecological and social shocks and continue to maintain its basic structure and function

wiki.resalliance.org
A social-ecological partnership

• Located in the central Negev desert in southern Israel
• Annual rainfall of 80-100 mm
• Characterized by high degree of geo-diversity resulting from long-term geological and geomorphological processes
• Currently in a start-up phase
The Negev Highland LTSER Platform: Multiple land use
Soils originating in dust storms during the ice age were transformed to agricultural land in the Byzantine time (6th – 7th century AD), by wise using of runoff water.
The desert city of Nizzana (southern Israel) and the Byzantine church.

Historical documents: The Nizzana Papyrus (6th – 7th century AD)

Wine press
The Nizzana Papyrus indicates:

Mediterranean crops were cultivated in the desert margin of the Levant during historical times
Desert agriculture facilities built by agricultural civilizations contribute to preserving the land and mitigate natural processes of desertification.
Desert agriculture facilities built by agricultural civilizations contribute to preserving the land and mitigate natural processes of desertification.
Agriculture plot

After the fields were abandoned, soil erosion took over.
SFAT MIDBAR (Desert edge)
Development of extensive agricultural and tourism park

Negev Highland Reservation

Small Bedouin settlement

The town of Mitzpe Ramon

Makhtesh Ramon (erosive crater)
Project planning began in 1996. Various delays caused farmers to enter the area prior to the approval of the plan regulations.
The challenge

• Repeated problems of soil erosion and uprooting trees led farmers ask for help from the Drainage Authority.
• The Drainage Authority ask the help of the LTSER scientists to help better understand land management practices and the challenges facing grape growers in developing agriculture under the hydro-ecological conditions of a rocky desert.
I learned and adapted the agricultural practices that I learned in the Jerusalem hills to the Negev Highlands conditions.
Planting the same direction of the flood’s flow leads to a constant struggle with soil erosion.
Problems in NANA Farm

- Soil erosion
- Agricultural
- Soil erosion on dirt
- Damage to pipes by wildlife
- Strong winds
- Washing of nutrients
- Soil salinity
- Soil erosion agricultural
- Grazing of livestock
- Grazing of wildlife
- Birds
- Insect pests
- Stealing equipment
- Dirt by soldiers
- Grazing of livestock
- Grazing of wildlife
I dream of reviving the ancient agriculture in the Negev Highlands
Planting vines perpendicular to the direction of flow slows down flooding, but access roads continue to cause soil erosion.
I prefer to plant on the terrace of saline soil, so that I don’t have to deal with floods.
Signs of saline soil around trees
Problems in PELED Farm

- Big differences of salinity in the plot
- Dirt by soldiers
- Stealing equipment
- Grazing of wildlife
- Grazing of livestock
- Birds
- Insect pests
- Damage to pipes by wildlife
- Strong winds
- Washing of nutrients
- Soil salinity
- Soil erosion on dirt

Graph showing the frequency of various problems in PELED Farm.
Mapping of partners
By the converging interviews
How to lead a resilient long-term social-ecological platform in a situation where the target audience is made up of such diverse stakeholders?

Is Participatory Action Research (PAR) the appropriate approach for this endeavor?

What is the role of scientists in this PAR context?
Modeling the social-ecological system structure and function
Building TD-PAR of stakeholders and multi research disciplines researcher in crystallization sustainable solutions

The numbers indicate the steps of development of a Transdisciplinary- PAR framework. (S (1-3)ToA: Stakeholder Theory of Action)
The current situation:
A socio-ecological model of farming in the Negev Highlands

- **Vegetation pattern formation:** Rows of vines instead of the desert heath

- **Farmer Activity:**
  - Planting parallel to the direction of flow in the stream

- **Ecosystem services:**
  - Provision of grapes
  - Regulation of soil erosion increase

- **Functional connectivity:**
  - Rapid flow of runoff

- **Geodiversity:**
  - Changing the roughness of the ground

- **Farmers demand repair of damage**
- **Drainage Authority repairs the damage**
- **Farmers feel confident to continue the same agricultural methods**
The product of the TD-PAR process: A socio-ecological model of farming in the Negev Highlands

- **Farmer Activity:** Planting perpendicular to the direction of flow
- **Vegetation pattern formation:** Rows of vines instead of the desert heath
- **Ecosystem services:** Provision of Grapes
- **Ecosystem services:** Regulation of Soil erosion reduced
- **Functional connectivity:** Moderate flow of runoff flow
- **Geodiversity:** Increasing the roughness of the ground

Farmers demand repair of damage

Drainage Authority

Reconstruction of ancient terraces

Farmers feel confident to continue the same agricultural methods
Conclusions

- The main goal of the LTSER platform is to design a resilience social-ecological system that is capable of learning and adapting to social and environmental changes.

- This requires establishing long-term action research partnerships.

- Preliminary interviews revealed a multiplicity of stakeholders involved in the area, in relationships of distrust and lack of respect, and a potential for conflicts between the various stakeholders.

- The challenge is threefold:
  - Partnership between researchers from various disciplines
  - Partnership between researchers and stakeholders
  - Partnership between different stakeholders

- Using models that present the complexity and the benefits of cooperation proved useful for connecting researchers from various disciplines and for contributing to assessing partnerships with stakeholders.

- Thought is required as to how to connect the various stakeholders. Do the models help?