

Blueprint

creating an
integrative design
for regenerative settlement development



Report

1st Intervention – Aug. 2015

Skala Ecovillage Greece

- Water Retention Landscape Design
- Biogas Technology

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Global Ecology Institute – Tamera

Caixa Postal 1,
7630-303 Colos
Portugal

E-Mail: global.ecology@tamera.org
www.tamera.org

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Blueprint intervention

**in Skala Ecovillage
Zagkliveri, Regional Unit Chakidiki, Greece**

August 22nd – 30th, 2015

**Summer Community Gathering,
Permaculture Design Education (PDE) and
Network Meeting**

Blueprint team:

Jay Abrahams	Permaculture and Natural Water Management
Martin Funk	Biogas
Bernd Walter Mueller	Water Retention Landscape Design
Christine Fischer	Assistant
Sandra Imhof	Assistant

Goal of the intervention:

Introduction of modules for a regenerative design of regional autonomy in the area of water, food and energy. The objective is to combine training with concrete manifestation in a communitarian setting and to visualize the potential of the terrain and its integration into the surrounding landscape. The intervention aims to integrate ecological, technological as well as social aspects.

The essence of the ecological intervention is the development of a way of water management which takes the natural water cycles as well as the reality of the surrounding landscape into consideration. This new manner of water management is the base for the infrastructure measures that need to be taken for regional water and food sovereignty.

The essence of the technological intervention is the introduction of the technology of decentralised biogas digesters as a local energy supply.

Introduction

This report covers a Blueprint intervention from August 22nd to 30th 2015 at Skala Ecovillage in Zagkliveri, Regional Unit Chalkidiki, Greece

The initiative for this Blueprint intervention arose from the GEN+20 summit in Findhorn in July 2015 and shall give an answer to the current crisis in Greece.

The intervention took place during the 'Skala Summer Community Gathering' and a 'Network Meeting'. 40 members of the Skala community and guests participated in the 'Permaculture Design Education'. Jay Abrahams, Bernd Walter Müller, Martin Funk, Christine Fischer and Sandra Imhof are the team of blueprint for the training and the implementation.

The report consists in a description of the situation, our observation, the given recommendations, the intervention and the education. A short introduction of the principles of the Water Retention Landscape and of biogas technology is given.

Photos of the assessed issues and the intervention are part of the annex.

Links to practical solutions direct to more detailed information.

Schedule of the Permaculture Design Education

Friday, August 21st

Arrival at Skala

Visit of Platanorema, a land 3km away from living area

Theoretical description of check dams on that example

Saturday, August 22nd

1st tour at Skala Ecovillage with community members

Evaluation of damages through erosion

Practical training with the optical level

Survey of the longest possible contour line on the new land

Sunday, August 23rd

Lectures from Bernd Walter Müller about:

- Introduction to the principles of Water Retention Landscape Design
- Political importance of decentralised water management and energy supply

Practical work:

- surveying and building a swale by hand
- rake and gather hey for later mulching



Monday, August 24th

Practical work:

- surveying and building a swale by hand
- rake and gather hay for later mulching

Lecture by Martin Funk on biogas technology

Design of the new land with Jay Abrahams and Bernd Walter Müller as preparation for the machine earthworks

Common ritual for the start of the earthworks

Tuesday, August 25th

Beginning of the earthworks of the highest swale with local excavator

Lecture by Jay Abrahams: WET - Wetland Ecosystem Treatment

Lecture by representatives of the Management Authority of Lakes Koronia-Volvi

and Macedonian Tempe to the water situation in the watershed

Practical works:

- Final earthworks on the hand dug swale

Wednesday, August 26th

Earthworks with excavator on the swale and the first terrace

Earthworks by hand at the swale and on the slopes

Start of the building of the biogas digester

Thursday, August 27th

Earthworks with excavator on terraces

Earthworks by hand on slopes

Seeding and mulching swale and slopes

Design exercises on the upper land

Configuration of the IBC container for the biogas digester

Friday, August 28th

Final earthworks with excavator on access road, lower swale, terrace, slopes and the swale overflow

Earthworks by hand

Seeding and mulching

Installation of the 4 IBC containers for the biogas device

Saturday, August 29th

Finishing the earthworks by hand

Finishing seeding and mulching

Building structure for leading road runoff to the swale

Configuration of biogas digester and gas storage

Presentation of the intervention in a tour also for the guests of the network meeting

Sunday, August 30th

Common ritual for the end of the earthworks

Tour with community members, final explanations, informations and instructions

Sustainable Water Management as the basis for rural and urban planning

Introduction to the principles of a Water Retention Landscape Design

Desertification, droughts and floods have a common reason: the damage of the hydrological balance by deforestation, industrial agriculture and sealed surfaces in urban areas. Naked soil becomes hot and loses the ability to absorb water. Rain erodes the topsoil. The earth body dries out, global groundwater reserves and soil fertility decreases. For food sovereignty we need a proper water balance.

A Water Retention Landscape is a model for natural and decentralized water management and restoration of damaged ecosystems. It is a basis for reforestation, horticulture and agriculture in regions threatened by desertification, and is part of a comprehensive model for sustainability on a large scale including water, food, energy and community building.

In short the basic principles of Water Retention Landscape Design are:

No rainwater should run over the earth surface but rather be infiltrated into the soil where it falls. Taking a certain territory into the focus the goal would be that no more rainwater and wastewater leaves the territory but rather all water flowing away comes from springs.

If the aquifer is recharged water is available from springs and from wells in sufficient quantities for all human usage. In most cases the soil and the earth body is not capable to infiltrate the rainwater immediately due to mismanagement. Therefore different methods are applied within the Water Retention Landscape Design to restore the water balance. This includes: building of retention reservoirs (ponds, earth and sand dams), terraces, low proportion of sealed surfaces, road water infiltration, swales, permanent vegetation cover, mulching, adequate grazing management, afforestation...

If the principles are understood and integrated in the planning and management, water is available all through the year, erosion is stopped, landslides are avoided, vegetation grows vigorously, rivers are constantly flowing, floods are moderate, risk of fire is low, decentralized biological agricultures enables local food security...

Therefore we stress the importance of sustainable water management. In countries which have a low development of infrastructure there is a large potential to implement it in the right manner and not repeating the mistakes of the past and current management.

A detailed description of the Water Retention Landscape Design is published in the brochure "**The Secret of Water**" by **Bernd Walter Müller**:

http://www.tamera.org/fileadmin/PDF/2.2_The_Secret_of_Water.pdf

Sustainable Energy Technology

Biogas Digester

Module for a decentral autonomous energy supply

“Biogas” is a naturally occurring mixture of 60 to 70% methane and 30 to 40% CO² with some H²S (Hydrogen Sulfide), that burns similar to so-called “natural gas”, which is actually a fossil fuel. Once generated and stored, biogas is primarily used around the world for cooking and heating at home scale, but it also has many other important applications both domestically and industrially. Its use as a fuel to power electric generators at all scales is well established and it also has a long history of use in gas lamps and absorption refrigeration systems.

When purified and compressed we see it used as an effective fuel for cars, trucks and buses (Stockholm – Sweden is a leader in this application). Thus biogas is a flexible substitute for non-renewable energy sources at many levels.

Additionally, its production creates a high quality fertilizer and provides feedstock for the creation of petrochemical substitutes so biogas serves to replace fossil resources on many levels.

A “biogas digester” is a simple system which produces biogas, via the natural anaerobic decomposition of organic material.

The biogas digester, once its “starter culture” of methanogenic (CH⁴ producing) bacteria has been established (usually several weeks after initial loading with animal manures or lake mud) can be fed daily with kitchen and garden waste. The ecosystem of bacteria in the biogas digester extract energy from the organic material and generate methane gas.

The digested organic material exits the system as a high-quality fertilizer in liquid form. This liquid anaerobic “compost” still contains all the minerals and other soil nutrients of the kitchen and garden waste, including the nitrogen that can be lost through aerobic composting.

A detailed description about Biogas Digester is published in the brochure **“Biogas Digester What is a biogas digester and how to build it? Module for a decentral autonomous energy supply“** by T.H.Culhane:

http://www.tamera.org/fileadmin/PDF/biogas_digester.pdf



Description of the general situation:

The Ecovillage Skala is situated 40km north of Tessaloniki in the Regional Unit of Chalkidiki. It belongs to the municipality of Zagkliveri and is in the Peripheral Protection Zone of the National Park of lakes Koronia – Volvi and Macedonian Tempe.

Skala is a clearing in the lower part of a north slope with mixed forest vegetation approximately 350m a.s.l.. Until 1970 the existing mixed forest was periodically completely clear cut for charcoal production. This is the reason why nowadays you find hardly any trees older than 50 years. Clear cutting lead to erosion of the topsoil and to the baring of the deep clay subsoil. Currently only 10% of the state owned forest is cut every 10 years. Due to this change in land use the natural forest and the topsoil are regenerating. Diverse flora and fauna are redeveloping. Further down in the valley in former times the first European Mulberry silk was produced. Many big Mulberry trees were beside the diverse forest determining the image of the landscape of this region. Today most of the valley is used for conventional industrial agriculture that uses chemical fertilisers, pesticides and herbicides on their fields.

Description of the ecological and hydrological situation

The land of Skala Ecovillage is in the southern upper watershed of lake Volvi. The average precipitation in the region is 460mm and rain events are spread over all seasons. Lake Volvi is with about 6.800ha surface the second largest natural lake in Greece and is at a distance of approx 15km to Skala. In the mid seventies the neighbour lake Koronia, spread over an area of 4.600ha and had a maximum depth of 8m. The draining of swamps and smaller lakes, the mismanagement of forest and agriculture land and the industrial contamination in the water shed led to the ecological collapse of the lake Koronia. Since the mid nineties the lake is only occasionally flooded and highly contaminated.

These two lakes mark out the core of the National Park and still form an ecological complex of high importance. It is an important place for migrating birds and life there thrives with 1.136 plant species, 343 bird species, 56 species of mammals, 35 amphibian and reptile species, as well as 29 species of fish.

In the forest on the top of the catchment mismanagement leads to heavy rain-water runoff. Large gullies have formed in the deep subsoil. The heavy erosion leads to a decrease of rainwater retention capacity in the whole area. That leads to more rainwater runoff, to landscape degradation and to significant floods in the canyons. These floods are causing infrastructural damages in the canyons and in the rivers and lakes further down.

Still one of the canyons next to Skala has water flowing throughout the whole year. The water supply for the Ecovillage is connected to a 2km long pipeline that connects to this canyon. Drinking water supply comes from a natural spring in 500m away from the Ecovillage.

Description of Skala Ecovillage

Skala Ecovillage was founded in 2000 as intentional community on 3ha of land. The land is a clearing in the forest and has canyons on both sides. At the moment three families live here with their children. Volunteers are supporting the community. In 2015 two more pieces of land could be added to the community land. One hectare is bordering directly to the north. Platanorema, the second, is a 4ha piece of land 3km away from Skala.

The topsoil eroded in the former time from the whole land. Deep layers of clay subsoil with poor vegetation are still covering the bed rock. The whole land is managed according to natural farming methods. The central part of the land is mainly terraced with off contour terraces, that can also be used for camping. Fruit and other trees in big diversity are planted all over the land. In the productive and diverse gardens, vegetables, fruits and herbs are cultivated biologically.

natural-farming.eu

The houses are build out of straw bales, clay or wood.

Electricity is created through photovoltaic panels. Heat through passive solar systems, stoves for wood and with conventional propane gas. It is seldom that a gasoline generator provides electricity.

Water supply comes from the nearby canyon through an old pipeline of the municipality. From there, it is pumped into different cisterns to provide water to houses, trees and gardens.

Waste water is treated naturally on the site.

The access to the land is through a 3km long dirt road. On the last 100m the steep road is paved with concrete until the south gate of the Ecovillage.

Platanorema is located in the valley and has its borders at the same river that provides the water to Skala. Also here damages of the river bed through rainwater runoff are obvious. Runoff erodes the subsoil, the river digs ever deeper into the land and washes slopes away during the floods. There was illegal sand mining on the land close to the river. The hole allows observation of the earth structure in the first meters.

Most of the 4ha land is a soft inclined clearing on which in former times cereals grew in extensive cultures. Old, big plane and walnut trees grow between the clearing and the river. Rainwater runoff, generated in the agricultural land higher up, is digging deep gullies into the subsoil of the very diverse forest on the south border.



Implementation

Water management

Practical implementation was an essential part of the PDE. Under the guidance of Bernd Walter Müller, Christine Fischer and Sandra Imhof, participants and community members build a first swale. This important Water Retention Module is placed in an existing orchard and retains the runoff water from the upper land and from the road nearby.



Building a swale in the orchard



The finished swale structure in the orchard

After three days of perception, survey, design and a ritual to informing the land, a structure of swales, terraces and an access road was built in the new land with machine support. During four days approx 0,5ha were designed according to Water Retention Landscape Design Principles.

The new built terraces are connected to the terraces of the existing garden. All terraces have access for tractors and the whole new built structure can be irrigated with the water from the canyon without pumping. Swales and slopes were seeded and mulched immediately. The lowest terrace can be used as road access that connects to the rest of the land. The lowest swale can infiltrate the road runoff. All the earthworks were made in clay rich subsoil.



Skala's 1ha new land before the intervention



The same land after the intervention



Energy

Under the guidance of Martin Funk and Sandra Imhof out of 4 standard IBC containers a biogas digester and a gas storage was built next to the main building.



New built Biogas Digester and Gas Storage at Skala

Link for further informations and updates by Martin Funk about the construction of IBC Biogas Digesters:

<http://www.biogascentral.net/wiki/644>

<http://www.biogascentral.net/news/biogas-experimentation-week-tamera>

Education

The Community Gathering in combination with the Permaculture Design Education and the Implementation was a supportive setting for a complex education situation.

Through the Community Gathering a base of mutual trust could be achieved. This was a solid base for learning and practising. The importance of natural water management in ecosystem restoration could be conveyed. Beginners and high skilled experts, local operators and international students, theoreticians and practitioners, had a possibility to deepen their knowledge in theory and practice in the different areas of local autonomy in water, food and energy supply. Community members from Skala got a detailed consultation to the ecological situation of their land and they were trained in the implementation and the maintenance of the suggested improvements.

For future educations, Skala now can showcase different important modules of regenerative design for settlement development.

Link to Water Retention Landscape Design Training in Tamera:

<http://www.tamera.org/index.php?id=1260>

Observations and Recommendations

General Observation

The Skala Ecovillage is a beautiful place and an interesting community with a very high potential of becoming a regenerative and productive model for local autonomy as well as an education centre for regional sustainable development.

Observation:

The water supply of the whole Ecovillage is at the moment depending on the old pipeline that leads canyon water by gravity into the lower part of the land. Rainwater runoff creates immense infrastructure destruction in the canyon, so that the sustainable functioning of that municipality owned water supply system can not be guaranteed.

Recommendation:

Development of a new water management concept for the Ecovillage that is independent of external water supply. Main element of this new water management concept is the redesigning of the whole land in a way that all the rainwater can be absorbed into the ground.

It is of high value to start to monitor the groundwater levels over the year. It is recommended to do this especially at the place that was chosen for a possible future well.

Observation:

The gardens are managed according to Natural Farming principles. Through this practice big diversity and topsoil is built.

Recommendation:

Extending the cultivated area to the newly built terraces, slopes and swales will help to build diversity and topsoil on a larger scale.

If possible the newly built terraces should be ripped before seeding.

Observation:

Roads and path are designed in a way that they accumulate rainwater and create runoff. This leads to massive road damages and drying out of the land. On longer roads like the access road to Skala this leads to creation of deep gullies that drain and erode the forest.

Recommendation:

The permaculture principles of rainwater management (SSS slow down, spread, sink) should be adapted very decentralised, like they were explained on examples during the consultation.

Redesigning the profile of roads in a way that water is not accumulating and can be redirected into swales on contour for the purpose of infiltration.



Observation:

The design of the upper part of Skala's land is ecologically, energetically and aesthetically unfavourable.

Recommendation:

Redesigning this part. Especially changing the course of the road.

Observation:

The ecological value of the relative small pieces of land, Skala and Platanorema, depend a lot on the ecological quality of the surrounding forest and agricultural land.

Recommendation:

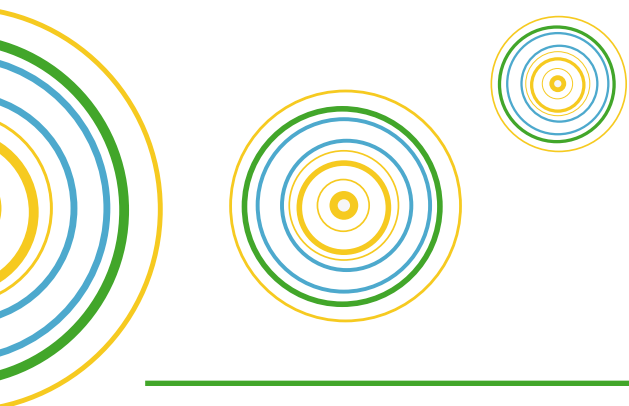
We recommend to also try to have influence on the restoration and the land use practices at the surrounding area, mainly the upper water catchment. This can be supported through education offers in which local authorities are involved.

Observation:

Platanorema, is a recent bought land with a high potential in many aspects. It was a too early stage to start with a specific implementation there.

Recommendation:

This land is still to be integrated into the vision of Skala as an Ecovillage. Once the specific function of the land is clear, the design can be made according to the given consultations.





aerial photo from Skala



aerial photo from Platanorema



Bernd Müller and Jay Abrahams during the survey



erosion caused by rainwater runoff



survey with community members



earthworks with participants





Martin Funk explaining the biogas digester



assembling biogas digester





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