

Research concepts and research questions on ecological aspects of allotment gardens

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FRAMEWORK AND PROCEDURE

During the Salzburg Summer School on “Allotment Gardens in European Cities” in the frame of the COST Action TU1201 from 1-4 July 2014 in Salzburg, Austria a module on “Ecological Aspects” was applied. The goal of this segment was to develop a common understanding of the allotment gardens position in the urban environment as well their importance for urban ecological processes seen from an interdisciplinary perspective. The following 6 general topics have been developed in advance, elaborated by individual groups of participants, presented and discussed during the first part of the module:

Ecological behaviour and best practice examples of allotment garden users: The aim was to give examples of ecological garden structuring and also in the production of food and flowers in AGs to encourage the urban biodiversity and recreation quality.

Allotment gardens peculiarity among others elements of urban green infrastructure: The comparison of allotment gardens with other green infrastructure: using the examples of (a) gardens belonging to private family houses and (b) public parks. The aim was to differentiate the different type of usages and to learn about the similarities and differences in the ecological functioning of the three biotope types in urban.

AGs environmental functions in the urban structure: The site/location of allotment gardens in the city as urban ecosystem: Aim was to explore by the example of Salzburg and other Cities a) typical sites of allotment gardens in the urban and b) to analyse and to interpret allotment sites in the cities in terms of their environmental function and the provision of additional benefits for other land uses in urban.

Soil, water and plants contamination in Allotment gardens: The aim was to demonstrate by using practice examples allotment gardens typical pollutants, their sources and to give examples on the mitigation of related health problems.

Allotment gardens as ecosystem services providers: Aim was to specify types of benefits for men, who are provided by allotment gardens by using the CICES 4.3 classification and to give examples of valuation of ecosystem services

The ecological role of allotment gardens in relation to geographical conditions: The object of the thematic was to summarize the impact of climatic -, ground water -, soil - and relief conditions on ecological aspects of AGs.

The groups was suggested to focus on the following structural elements a) to propose an thematic structure of the considered topic; b) to give an overview through the state of knowledge based on the literature; c) to present selected case studies or good practices related to the topic.

The presentations and the following discussion were the base for the development of new research concepts related to the topic. Using the *world café* method the rearranged participants groups rotated through all of the topics listed above and completed their own research ideas.

RESULTS

Ecological behaviour and best practice examples of allotment garden users

Proposed research questions:

- How to prove if a allotment garden is used on sustainable ways?
- What types of waste materials (e.g. like plastic) can be accepted for use in allotment gardens?
- Which kinds of materials used in AGs and on which way can be reused or recycled?
- What are the effects of fairing with painted wood waste on the air and soil in AGs?
- What are the effects of composting particular kinds of organic matter on soil?
- How far AGs users are familiar with ecological cultivations methods?
- The usefulness of Stimulation (increasing or decreasing) the pH value of soils in AGs?
- How the AGs users' behavior impacts physiochemical properties of the soil?
- How far AGs users practice the ecological behavior?
- How far the local policies regulate the use of pesticides in AGs?
- What are the traditional methods to improve AGs soils fertility?
- What motivate people to adopt environmental sound gardening practices?
- What is the impact of AGs users' behavior on the environment?
- How is the attitude of AGs users to the reusing of organic waste?

Additionally participants formulated following research suggestions regarding the AGs users' behavior:

- The creation of a data base about allotment gardens in diverse European countries;
- The usage of interviews and questionnaires to describe differences of gardeners behavior motivations between allotment gardens, community gardens and private gardens;
- The investigation on the land use history of sites used as AGs as well the examination of soils properties;
- The research concerning the knowledge on best practices for reducing the AGs exposure on pollution;
- The research on methods how to disseminate on the efficient way the information about AGs soils prevention against contamination;
- Use of a questionnaire to examine management practices which may influence AGs soils quality, including the prevalence of composting *in situ* as well use of manure, fertilizers and commercial compost.
- The investigation of factors affecting the behavior of AGs users, such as attitudinal factors such as beliefs, norms, contextual factors such as constraints and personal capabilities such as specific knowledge, skills and motivation;
- A research to investigate the relationship between environmental concerns of the users and their environmental behavior.

Allotment gardens peculiarity among others elements of urban green infrastructure:

Following research questions have been proposed:

- How important is using community gardens for recreation comparing to other green urban areas such as public parks.
- How to find a good balance between particular elements of the urban green infrastructure considering their functions, as well social and ecological values?
- How to use individual elements of green infrastructure to stimulate the consumption of self-planted high quality food; How to increase the social awareness to the importance of healthy food patterns?
- What is the capacity of the urban green infrastructure to provide habitat for animal and spontaneous plant species compared to other parts of urban green infrastructure.
- How to gain stronger spatial connectivity between different elements of green infrastructure regarding to ecologic, social and economic preconditions?
- What is the impact of allotment gardens, community gardens and private gardens on property prices in the neighborhood?

Allotment gardens environmental functions in the urban structure

Following research questions have been formulated:

- What are the preconditions for at least partly opening AGs as public space?
- How is the relation between the AGs accessibility by public transportation and the transportation used by gardeners?
- How change the AGs impact on:
 - (a) The urban spatial structure?
 - (b) The people's behavior in historical context/ background?
 - (c) How it was before, how it looks now and what are the perspectives/plans for future?
 - (d) Some scenarios (with various visions of AGs future) can be elaborated and AGs users could choose the suitable one.
- Precondition of using AGs as supportive elements of green corridors, taking into account city structure, climate, and density of population?
- Can AGs improve quality of the urban brown fields, when “yes” on which way?
- What roles play AGs for dwellers in the larger scale and for individuals?
- How far and on which way AGs are important for people that don't have any plot and just pass by them or live in the neighborhood?
- How important could be the AGs accessibility for pedestrians and cyclists passing them through?
- How the functions of AGs are connected with the society? (E.g. the food products are sold at the marketplace or for the local restaurant).

Soil, water and plants contamination in allotment gardens

The proposed research questions have been divided into three groups: descriptive, explanation and operational knowledge:

Descriptive knowledge

- Can the urban gardening be really organic? Check this in diverse urban areas with different characteristics (previous land use, barriers around the gardens) and test their relative importance.
- How far the plants vulnerability depends on particular environmental conditions (direct sun radiation, water availability, etc.)?
- Are there plant specific contaminants?
- How far plastic pots and old tires used in AGs may be sources of soil contamination by heavy metals?

- How deep the contaminated soil has to be removed for cleaning to shape a safety environment for AGs users as well to assure the proper food quality?
- Are the vegetables produced in AGs (which are exposed to urban air contamination) “less healthy” than the organic products accessible on the market?

Explanation knowledge

- How is the correlation between the distances from highways the level soil, water and plant contamination in the gardens?
- The AGs users understand the bio-gardening variously. Which role plays the relation between users for their cultivating behaviour (respecting the “rules”)?

Operational knowledge

- How to improve the way the administration performs by soil testing? (Scottish question, cases when administration closed the gardens for several years based on bad testing methods – not enough sampling points etc.)
- What to do to use the knowledge already tested in AGs, in our daily home life? (e.g. use water from shower to gardening)
- What to do to use AGs as experimental labs? Could it be possible to use some of plots or parts of individual plots on different way to test diverse cultivating methods and various plants?
- Create an efficient methodology to check if a site is contaminated.
- How should be composed a good policy agenda? (test diverse scenarios of methodology steps in order to define possible good sites for gardening)
- What to do to convince politicians and teachers to include in the educational system a new module about gardening? (Children living in urban areas should practicing cultivation and learn about it).

AGs as ecosystem services providers: Limitation and research issues related to ecosystem services and their valuation. **Key aspects of research are developed by the aim to clarify:**

- At what spatial scale should ecosystem services considered? They change with size and distribution of allotment gardens, e.g. spatial distribution and aggregation of allotment gardens into larger groups is not accounted for. Their aggregated shape could e.g. lead to additional functionalities such as green corridors or increased social functions when they serve as community gardens. Spatially inexplicit aggregations could create more common areas shared by different allotment holders thus creating additional cultural and social services not accounted for by solitary or only few plots.
- A further distinction regarding ecosystem services values should be achieved according to garden usage, e.g. allotment garden, community garden and public parks.
- Better ways to communicate the importance and value of ecosystem services to the public, planners and stakeholders are needed.
- Clearer guidelines of what valuation scheme should be used for what purpose and for what peer-group with what cultural backgrounds are needed (e.g. MEA, TEEB, CICES, de Groot, Constanza...)?
- Valuation of allotment ES varies from peer-group to peer-group and clearer delineations are needed, the perspective defines the actual values.
- We should rather value ES based on what we would lose if their respective ecosystems disappeared, not from a perspective of what they’re worth.
- New price indicators should be developed.
- Some philosophical considerations to initiate a paradigm change in how to (e)valuate ES:

- We have the responsibility to protect something that does not have a direct value for us yet in any case, even if it does not generate any monetary value for us. Do we consider us as part of an ecosystem? How would human ecosystem services benefit the natural environment – would we have negative values?
- A bold and disputable statement in the end – a very simple and practical of how to value an allotment garden would be: “The value of an allotment garden can be summarized by the rent the lessee currently pays.” From this top-down approach, one could look at the elements of a garden and split the rent proportionally to all present garden features.

The ecological role of allotment gardens in relation to geographical conditions: The discussion was mainly focused on biodiversity and native and invasive plants. Fauna issues have not been discussed. In detail the research question are on:

Allotment gardens and Native plants

- Native species are proposed for allotment gardens because:
- They are easy to handle/cultivate/ take care of
- Irrigation: only when needed /they do not suffer oft by water stress

Native plants and climatic change

- they can survive or...they can't survive
- We could through monitoring specify strong native plant species affordable to handle

Invasive plants

- Could be dangerous
- That's why are suggested:
- Research guidelines for allotment gardeners
- Proposal of planting specific plant species in specific areas (research on soil, water conditions)

Invasive plants and prognosis of climate scenarios in the area

- Alien species should not be (totally) removed or replaced...
- An alien sp. could fit better in the future than in the presence, due to climatic change
- or move to other/different climatic zones, where there is need of plants
- invasive plants of today, will not be definitely the same in the future (because of the different climatic conditions)
- Connect north-slope- with south-slope-species, in order not to lose species because of the climatic change.

Create biodiversity in cities, create green cities

- Find a way to promote allotment gardens (or generally urban green spots) in areas, where there aren't any.
- introduce biodiversity to cities
- create open-air schools, where education and at the same time contact with nature can be achieved
- describe plant species (with labels) explaining their role in each area and in the biosphere (giving a reason to start gardening, to obtain ecological consciousness)

Further annotations on the general thematic on ecological aspects of allotment gardens was made that it is important to promote the agro-biodiversity conservation in urban gardens, concretely landraces. Landraces are annual and biennial crops that have been reproduced by

farmers during more than one generation (30 years or more) in a specific geographic area, keeping the seeds continuously. For perennial crops and crops with vegetative reproduction, the term landrace can be used when a specific crop has been cultivated and reproduced in the area for more than 60 years. These crops have been selected by the farmers from domesticated or wild species, adapting them to the local environmental conditions and to the local agrarian culture uses and management. As well as they are normally out of the formal market and shared via informal social networks, informal markets or seed banks. It is proposed that that urban garden could promote to conserve landraces from nearby rural areas. In addition, landraces conservation promotes the preservation of traditional ecological knowledge associated to them turning urban gardens into biocultural refugia spots.