Sessions proposed for the 11th SUITMA conference

Session 1: Soil health in urban agriculture (Remigio Paradelo, Anna Paltseva)

Urban food production has been increasing in importance during the last decades, along with the rise in urban population. Urban agriculture is a way to secure a supply of food in urban areas, as it is estimated that, in 2050, 80% of the world's food will be consumed in cities. However, deploying urban agriculture is not exempt from issues, among which soil health status is an important one. Due to their location, urban gardens are highly influenced by past and present anthropogenic activities, threatening both soil health and food safety.

These soils typically have very low functionality and high levels of pollutants in soils can be a severe problem for growing produce. Humans can get exposed to contaminants by consuming vegetables grown on contaminated soil (that are rarely analyzed since they do not enter commercial circuits), incidental soil ingestion, and dust inhalation. Thus, good soil health is an indispensable requisite for the safe and sustainable development of agriculture in cities, more importantly even than traditional agriculture, because of the characteristics of land where it is practiced. The main goal of this session is to provide a comprehensive view of soil health status in urban agriculture. Contributions from different regions of the world and different aspects of soil health (e.g., soil structure, soil pollution, soil fertility, biodiversity or soil organic carbon) are welcome.

Session 2: Soil pollution and urban food growing (Liliane Jean-Soro, Béatrice Bechet, Thierry Lebeau, Cécile Le Guern)

Nowadays, urban gardens include allotment gardens, home gardens, community gardens including social inclusion gardens, but also gardens on public spaces (for example: incredible edible initiative), guerilla gardening (appropriation of derelict area) and gardens at the foot of buildings.

The growth of these various urban gardening forms over the past four decades promotes the multifunctionality of these spaces. They are increasingly used for leisure and recreation, but most of the users still consider the cultivation of crops as the main motivation. Like other urban spaces, the soils of these gardens can be affected by pollution due to their location either in the city center or suburbs. Pollutants in urban soils can originate from various diffuse anthropogenic sources. This includes the past and present industrial and urban activities, including traffic activities, but also the past and current practices of plot management by gardeners. Potential inputs of artificial materials and household objects, use of fertilizers and pesticides result in contamination by trace metals or metalloids and organic compounds.

Therefore, health risks are associated with urban gardens and food production. Question arises as to whether urban soil garden is a substrate of sufficient quality to produce vegetables for home consumption due to the risk of contamination. Indeed, accumulation of contaminants in edible parts of vegetables growing on these urban soils may be observed.

This session will focus on soil pollution, risk of pollution transfer to vegetables and soil management actions to reduce the impact of contamination on vegetables; at garden and plot scale. Expected

presentations are case studies with site presentation, soil characterization, transfer into vegetables and modeling, as long as site management.

Session 3: Amendments for SUITMA Soils

3a Amendments for soil and substrate in urban green infrastructure and NBS (Francesca Bretzel, Eliana Tassi)

Soils provide important ecosystem services: water storage and filtering, nutrient cycling, carbon sequestration, provision of habitat for flora and fauna and primary production, as reported by the Thematic Strategy for Soil Protection of the European Union and the EU Mission for Healthy Soils. However, soils are subject to anthropic impact which can often cause degradation and loss of ecosystem services: pollution, compaction, erosion, loss of organic matter and structure, reduction of biodiversity. On the other hand, soils are resilient, able to adapt and act as filter, they immobilize and degrade pollutants, especially thanks to its biological component. Enhancing knowledge about novel soil amendment and how they affect functionality: nutrient cycles, fertility water storage and drainage and biodiversity, helps understanding how to obtain a healthy urban environment. Many kinds of waste from the city and industry containing great amounts of organic matter and fibers (green compost, paper sludges, biochar), can be valorized as soil amendments and components of novel substrates. On the other hand, soil amendments could be a source need to be studied to find out their limits and provide solutions, for instance they could be source of new contaminants, not yet subject to authorities control, as micro plastics, metallic nanoparticles, etc., which can pose a threat to environment health. The necessary shift from the prevailing linear approach towards a more holistic and circular design in cities in a Nature-Based Solutions perspective goes in the direction of keeping the resources in use and redesigning waste externalities.

3b Organic amendments as improvers of SUITMAs (Luke Beesley, Manhattan Lebrun)

The Food and Agriculture Organisation (FAO) states that one third of the Earth's soils are already degraded and that over 90 % could become degraded in some way by 2050. Therefore, it is crucial to find ways to rehabilitate degraded soils and restore their functionality. The application of organic amendments is already a common practice in agriculture in order to improve soil fertility. Composts, manures, biochars, digestates and sludges, are known to have the following effects: (i) improvement of soil water retention and thus reducing drought stress; (ii) providing essential nutrients, i.e. nitrogen, phosphorus and potassium, for microorganisms and plants; (iii) supplying organic matter; (iv) ameliorating soil aggregation and structure, and (v) adsorption of potentially toxic elements, reducing their leaching to proximal waters.

This session aims to review the state-of-the-art in studies that have amended or produced SUITMAs using one or more organic amendment. Specific attention will be paid to the synergistic effects on soil physical, chemical and biological properties observed in laboratory, and especially, field trials.

Session 4: Constructed Technosols for the implementation in urban blue-green infrastructure (Moreen Willaredt, Thomas Nehls, Björn Kluge)

The designated formulation of soils and their implementation has been proven to re-establish lacking soil functions into urban areas. Such functions can be pollution control, storm-water retention,

hydrological optimization and habitats for street trees, green roofs and vertical green - all especially interesting for the transformation of sealed soils. Available parent materials for technosol construction are divers and present location-specific characteristics. Empirical studies on exemplary Technosol compositions demonstrated the potential of individual compositions to fulfill certain soil functions. This session aims to collect and to generalize applicable purpose-oriented Technosol recipes and processing protocols.

Session 5: Soil Activities by Urban Governments (Wolfgang Burghardt)

In the last 40 years there was an enormous progress of implementation of environmental issues in development of cities. There are two large challenges: soils are in nature the location for food production and natural resources provision, and stands, sources and sinks of natural environment as well as grounds of constructions for housing, enterprises and streets. There is a big competition between both. Constructions bring advantages for housing and economy but disadvantages for urban nature and its function for quality of human life. To secure the quality of urban life, areas of open soils must be to a certain degree available. The soils should be kept in a high quality. The aim of the session is to give an insight of advances of inclusion of soils in measures in urban areas by city administration and governments, what is done to minimize soil consumption and sealing and adverse effects from them, and to secure a high soil quality and all the soil functions demanded for urban life.

Beside others, major themes are:

- soil use effects, soil sealing, urban greenery, food production, play, sport, entertainment and recreation grounds, heat islands, dust, air quality, carbon and nitrogen sequestration, storm water infiltration and water storage, protection of soils,

- city planning, availability of investigation resources, city legislation, inclusion of soil issues and organization of responsibility.

It should be also included the request of soil information from soil science, the way of availability, and its implementation in urban administration and government. We are interested in contributions of cities of any size and economic core area.

Session 6: Nexus Urban Soils – ESG ratings, significance and management of soils for enviromental, climate and health impact by enterprises (Wolfgang Burghardt)

We have the interesting progress on capital markets, that the demand for environmental protection has got an additional effective backing by inclusion of ESG-risks in the rating of credit status of enterprises. This becomes not manifested in laws and provisions, but in ratings as instrument of economy, which are new. Soil scientists know too little about this. On the other hand, enterprises and their rating agencies need applicable information about soils, the role of soils in environment and about soil protection.

The questions arise now: Which knowledge must and can a natural scientific and geographical discipline as the soil science provide for enterprises and how this knowledge must be provided, and how it will be implemented in the enterprises and the rating procedure of enterprises?

It is envisioned, that the session contributions report about the interest, the must, requirements, and already existing experience of implementation of pedological (soil science) knowledge in enterprises. Thereby the way and other aspects of use of pedological knowledge for determining the ESG-ratings will be presented. Contributions to the session will be either oral or as poster.

Session 7: The urban soils working group in the German Soil Science Society (Lutz Makowsky, Tina Thrum)

In this (closed) session, the Urban Soils Working Group of the DBG (German soil science society) will present their numerous activities. This session will be broadcasted from the DBG conference.

Session 8: The open session on SUITMAs (*Christina Siebe, Viacheslav Vasenev)*

In this session we invite contributions, that formally do not fit to one of the other sessions, but which belong to SUITMA. SUITMA has always been an interdisciplinary conference, open for groundbreaking new studies and important generalizations and lessons-learned contributions.