

Urban Gardening and Health

Snowman Urban Soils Project

Relationship between City-Dwellers and Soils: How to use Urban and Peri-urban Soils to face the Urban Challenge?

31 October 2014

Venue: The National Institute for Public Health and the Environment

Bilthoven – Utrecht, The Netherlands

Meeting report



The meeting was attended by:

Name	Affiliation
N. Bal	OVAM
S. Barbieux	GxABT
L. Baudelet	Graine de jardin
H. Bonnavaud	Fédération Nationale des Jardins Familiaux et Collectifs
L. Boukharaeva	CNRS
G. Colinet,	GxABT
M. de Cleen	Ministry I en M / RWS
L. Dirven	RIVM
E. Goidts	SPW Wallonie
A. Hobbelink	AVVN
H. Kruize	RIVM
R. Leyh,	GxABT
M. Marloie	CNRS
P. Otte	RIVM
P. Romkens	WUR
J. Sapijanskas	Developpement -durable gouv.
F.A. Swartjes	RIVM
M.ten Hove	Soil Technical Committee
E. van Balen	GGD Rotterdam
T. van den Dop	RIVM
G. van Gestel	OVAM
E. Verhallen	RWS

Agenda and presentations

10.00 – 10.10 Louiza Boukharaeva CNRS, Urban Soils project Coordinator.

Welcome and opening: *Urban Gardening and Health Seminar* as a step in the Research Network "Sustainable Development of Cities: the Relationship between City-Dwellers and Nature". Reflections, apprehending, attitudes for advancement in *Snowman Urban Soils* health study

Good morning everybody,

It is with great pleasure that I open the 11th session of the International Seminar "Scientific Research, Higher Education and Public Policy for Sustainable Development of Big Cities." Since January 2009, eight sessions have been conducted as part of the work of the Research Network "Sustainable Development of Cities: the Relationship between City-Dwellers and Nature". Most of these sessions have been held in Paris, with two in Kazan in Russia, and one in Bello Horizonte in Brazil. You can find reports of these sessions on our website latio.org, under the section "Publications". These sessions enable us to gradually accumulate knowledge about our research topic, which is now being researched as part of an agreement with the SNOWMAN Network. The subject of this agreement is "The Relationship between City-Dwellers and Soils: How to use Urban and Peri-Urban Soils to Face the Urban Challenge?" and its shortened name is "Urban Soils".

Today's meeting is the first that we have had since the start of the agreement one year ago – on November 1st, 2013 – and is part of the final phase for the research conducted by our Dutch colleagues at the National Institute for Public Health and the Environment / RIVM. Researchers at RIVM will therefore present us with the progress and results of their studies.

We are at a strategic turning point because we have to use these results in three ways:

- First, they will be disseminated through publications and other means; this aspect will be presented this morning by Piet Otte and Tom Van Den Dop;
- Second, we will seek to understand how our research on urban gardening soils can expand in synergy with the research that RIVM continues to drive under the "Phenotype" programme. In particular, we will hear a statement from Hanneke Kruize on this subject;
- Finally, we will identify how these results will serve us later in our joint research, mainly in completing WP 4 on Urban Gardening and Health, but also in other WPs. This identification process will begin at the workshop this midday, led by Liesbet Dirven and Marcel Marloie. It will continue this afternoon with presentations by our colleagues from Belgium, GxABT Gilles Colinet, Sophie Barbieux and Romain Leyh.

We have reserved time at the end of this session especially for gathering comments and suggestions from other participants. Apart from the researchers directly involved in the project, we have invited the SNOWMAN network programme officials: Esther Goidts from the DGARNE of Wallonia, Simon Moolenaar from the SKB of the Netherlands, and Jurgis Sapijanskas from the French Ministry of Ecology, Sustainable Development and Energy. By having a shared view of all the research being conducted in Europe and worldwide on our topic, your information and advice – ladies and gentlemen – help us position our current and future research within the scientific landscape.

In addition, we have invited representatives of the stakeholders affected by our scientific subject. We know that your knowledge and practical experience give us information, helping us reach areas of research and disseminate our results. Our aim is to form an alliance to move ahead in understanding and resolving problems.

SEE PDF : L-BOUKHARAEVA -WELCOME AND OPENING STATEMENT.PPTX

10.00 – 10.10 Piet Otte, RIVM.

RIVM's Welcome and notes to the agenda of the seminar. Some remarks about RIVM research on urban soil, urban green and health.

Piet Otte welcomes all the participants of the seminar at RIVM.

The interest in urban agriculture is growing. This is proven by the fact that we welcome today more than twenty participants from France, Wallonia, Flanders and the Netherlands. RIVM is pleased to be the host of this meeting.

The main activities of RIVM cover health, food and drinking water, environment and calamities. It is interesting that this study on urban gardening covers three of these theme's being a good example of integral research.

We have an interesting agenda in which the preliminary results of the project will be presented. There is much room for discussion and the exchange of experience and opinions. We think that this seminar will therefore contribute to the progress of the project.

We hope for an interesting day

SEE PDF: PIET OTTE - WELCOME ON RIVM.PPTX

10:20 Hanneke Kruize, RIVM.

Lecture: Investigating the positive effects of nature on health and well-being. Lessons learnt from RIVM projects on nature and health.

Hanneke Kruize highlights the activities of the Phenotype project as well as the approach and its initial results. She explains that phenotype focuses on the relationship between green space and health. This is of great value for the urban soils project.

PHENOTYPE is focused on the integration of human health needs, and the translation of the research outcomes into recommendations for policy makers and guidelines for professional practitioners. It will include both positive effects and preconditions for the natural environment to have a positive effect on health. Within the Phenotype project, RIVM is responsible for Workpackage 2 – Mechanism Assessment, lled by Hanneke Kruize. This research focusses on potential mechanisms of the health benefits in relationship to exposure to the natural (green) outdoor environment. Included are physical activity, stress reduction, restoration, social contacts, and reduction of exposure to environmental hazards. Phenotype WP2 explores the mechanisms underlying the relationship between the natural environment and health & well-being for different population groups. The focus will be on different levels of urbanity and rurality, and include both 'green' and 'blue' areas. More information can be found on the website of phenotype

SEE PDF: SEMINAR URBAN GARDENING AND HEALTH-KRUIZE_DEF.PDF

SEE www.phenotype.eu

11:00 Tom van den Dop, RIVM.

Lecture: Green cities: Good health – Green space, urbanity and health : how strong is the relation?

Presentation about the findings from my master thesis, which focused on the effects of greenspace on obesity and depression. The findings are based on a literature study, expert interviews and document analysis. In the Netherlands (as in many other countries) there is a global trend in increasing numbers of people suffering from obesity or depression. Currently half the men over 40 are suffering from obesity and 550.000 people are suffering from a depression. What can greenspace do to stop these increasing social problems?

After conducting a literature study, I concluded that there are generally four way's in which greenspace can have a positive effect on health: air quality, physical activity, social cohesion and stress reduction. Greenspace may lead to reduced air pollution, cool down the environment and reduce energy strain on buildings. Increased physical activity may be attributed to greenspace and reduced obesity and mental health problems. Greenspace may also lead to better social cohesion in a certain area because it connects people. Currently in the scientific literature, few research has been done concerning the relationship between greenspace and social cohesion. The last way in which greenspace can have a positive effect on health is stress reduction. Stress reduction may be realized through enabling people to rest their mind from everyday stressors.

A document analysis showed among others that all respondents think that greenspace can contribute to better health however most of them state that they don't really understand how greenspace contributes to better health. Respondents from public organizations tend to not use any scientific literature when forming their goals and policy's. Few organizations evaluate their programs due to a lack of time, funding, resources, knowledge or interest.

All in all the research that has focused on the positive effects has produced diversified results. Aims for the future should be to produce coherent results.

[SEE PDF: TOM VAN DEN DOP - URBANITY AND HEALTH.PPTX](#)

11:30 Piet Otte, RIVM.

Lecture: Urban Gardening and Health: Preliminary results and findings of the Urban Soils project Work package 4

Healthy Urban Gardening; The relation between urban gardening and health
The urban soils project studies the role, function and use of urban soils for the Family urban collective gardens. Economic and social perspectives; Perceptions and Practices; Children, soils and educational policies and also the relation between Urban Gardening and Health. In work package 4 the study focusses on the relation of urban gardening and health. The findings of Work Package 4 intends to support the aims of other work packages. For instance to structure and formulate certain questions in the inquiries. And, in the end, to help to interpret the answers. Within WP 4 (Urban gardening and health) we address to main questions: What we know about the relation of soil quality, urban gardening and (perceived) health? Can we identify and describe relevant factors and indicators? It is emphasized that the questions we tackle (namely the relation between urban gardening and health) are quite complex and that definitive answers will be given only after many years of work within multi-disciplinary teams. There are many opinions, believes and indications about the benefits of urban green, nature and urban gardening for health. Examples of these are: Community gardening is associated with a lower body mass index. Older allotment gardeners reported having more contacts with friends and felt less lonely than did non

gardening neighbors in the same age category. Multiple pathways may be purposefully combined in cultural practices that regularly bring people in contact with nature. For example, community gardening may promote social contacts during moderate physical activity that also supports restoration from stress associated with work or other demands. For this study we try to relate urban gardening with so called perceived health. Perceived health is considered as a good indicator for 'real health'. Besides, 'perceived health' is 'to ask for' by questionnaires. There are a lot of studies, and the number is growing, about urban green, nature and the relation between health. For this study a literature search WAS DONE on urban gardening and health and this yielded in more than 160 hits only for the period 2010-2014 (slide 7). To visualize possible relations of urban green with health and to structuralize research, conceptual models are drawn up. Here you see an example of such a conceptual framework for the relation between green space and health along three 'driving forces' (Impact – Behavior – Selection). A very detailed and comprehensive framework was published by Tzoulos. This framework is interesting because it enumerates all possible features and factors which are divided in three environmental groups and four health groups. Environmental factors are the types of green infrastructure, ESS and Ecosystem health. Health is divided in health on community level and individual level. Striking is that allotments were not seen under green infrastructure. All interactions are two sided, together with the many factors this shows clearly the complexity of the relations with health (slide 9 and 10). Another framework was drawn up by Hartig. For this design it is important to notice that the definition of 'Nature' is broadly laid. It includes all physical features and processes of non-human origin that people ordinarily can perceive, including the "living nature" of flora and fauna. In this framework one could find the Natural Environment (Nature), the factor of having Contact with the natural environment, Four Health factors and the resulting health and well-being score (slide 12). From these studies (and others) we can draw up a framework specifically for the relation of urban gardening practices and perceived health (slide 14). In the first box you find allotments as one of the many types of green infrastructures. The factor contact is specifically tailored to urban gardening practices. The various health factors as stress, physical activity, violence, social cohesion en socially profitable. The factor 'absence of health risks' is the factor that deals with the use and management of contaminated soils. In most European countries the issue of contaminated soil is addressed. Urban gardeners grow food and this should be safe. The chemical quality (soil must be clean) and fertility are of concern (slide 15 and 16). Concerning the issue of contaminated soil, many countries have developed legislation to bring risk levels below certain numbers. The bottom line is that health risks due to contaminants need to be managed. The quality of allotments depends in general on the functioning and the quality of the soil ecosystem. The functioning of soil ecosystem services needs to be maintained and assessed. The ecosystem health is in fact the resultant of the functioning of ESS and vice versa. Ecosystem health is considered as the actual status of (in our case) soil quality. For urban gardeners, contact with the environment, nature and more specifically the soil water system is in general more intensive than as it is the case with other urban green infrastructure e.g. urban parks. A possible indicator regarding the relationship of urban gardening and health is the functioning of soil ecosystem services. Soil ecosystem services are the contribution of the ecosystem to human well-being (slide 17 and 18). There are several arrangements of ESS. A classification is often made in so-called Provisioning services, Regulating services, Supporting services and Cultural services. For a sustainable system all four services should optimized. Important factors for the assessment and the optimization of the functioning of soil ecosystem services are: Soil structure; nutrient retention and provision; pest and disease control; resistance and resilience; organic matter (production and degradation); water management and purifying capacity of soil; climate function and habitat function and biodiversity. For the inquiries we have to consider to ask about the soil ecosystem services e.g. about pest control, water management and biodiversity (e.g. the

presence of earth worms, butterflies and bees (slide 22). Are we able to formulate indicators for the evaluation and/or the assessment of ecosystem health and the functioning of ecosystem services? Indicators, this is still a point for discussion, should be as simple as possible and the assessment should be, in the ideal situation, realized by the gardener self. Concerning the health benefits we composed several fact sheets for stress reduction. The findings from literature (slide 25) should be confirmed through the inquiries amongst urban gardeners and others (slide 27).

[SEE PDF: PIET OTTE - URBAN GARDENING AND HEALTH.PPTX](#)

11.50 Liesbet Dirven, RIVM

Movie "Benefits allotment gardening"

This short film gives an impression of how gardeners enjoy their activities in their garden. They talk enthusiastically about their garden, their motives and experiences and show how gardening intervenes on their health (perceived health) and life style.



FOR VIEWING THE MOVIE, LOOK AT:
WWW.BODEMAMBITIES.NL/ONTWIKKELINGEN/STADSLANDBOUW.NL

12.00 Marcel Marloie (CNRS) and Liesbet Dirven (RIVM).


Workshop: Urban Gardening and Health - Soils in focus.

The objective of this workshop was to harvest good questions for the questionnaires in further researches of the Dutch, Belgium and French partners. Topics concerns two main components: (1) Sanitary risks caused by the soil pollutions and (2) Positive functions for the health in the physical, psychological and emotional plan.

This morning, about positive functions for the health in the physical, psychological and emotional plan we showed that there is a lot of literature explaining that gardening is good for health.

For the workshop the participants added their questions on several posters for the following 5 topics:

- Effects of urban gardening on health
- Perceived health
- Esoteric literature (Geobiology - radiestesy)
- Ideas for future questionnaires
- Addition to the interviews at field visits

<p>Effects of urban gardening on health</p> <p>1. How can we identify the results from physical activity? Do you vary in the type of work, like heavy work and less heavy work?</p> <p>2. How can we identify the results from contact with green nature? We can see how awareness improved and so how people became closer to animals, natural activities</p> <p>3. How can we identify the results from contact with soils? X</p>	<p>Ideas for future questionnaires</p> <p>1. About diseases of the gardener. -measuring through questionnaires for self-perceived health, back weight, diet, Pesticides related diseases, Backache, Lyme disease, history of garden i.r.t. contamination; -medical survey/registration-assessed by health professional (metabolic in blood); -ask experts what is the possible risks of the soil, after that ask the same question at the gardener; -heavy metals related diseases: difficult to proof depends on many factors; -injuries during gardening activities.</p> <p>2. About cultivation and health goals X</p>
<p>Perceived health</p> <p>1. How to collect this type of testimony? Ask about: -use of garden, soil use, food production; -sleep quality after working in garden; -Concentration level; -keep it simple; -different locations at different opinions; -Motivation;</p> <p>2. How to measure this? X</p>	<p>Addition to the interviews at field visits</p> <p>1. which surveys about soils can be conducted? Questions as: -Are you aware of possible contamination and sources? Do you care? -Do allotment gardens pollute more than farmers? -Use of fertilizers and pesticides; do you need information? Do you accept less quality? -What type of fertilizers organic or chemical? -What measures are taken to reduce pollution and risk? -Are you familiar with soil visual assessment and do you like to use it? -about information and training on soil quality? -About production? -do they let their plot analyzed and is information available? -Ask about biodiversity at the site; -Do you think earthworms are good? -what do you do to maintain good soil? -soil erosion; -water quality for irrigation; -Do you care about the soil? -is using soil a sport / hobby or is it a need? -do you know the soil type? -Is it possible to grow everything you like on this type of soil? Do you want this?</p> <p>2. Which surveys about health can be conducted?</p>
<p>Esoteric literature (Geobiology - radiestesy)</p> <p>1. Should we ignore the esoteric literature? Identify the feeling when people touch the soils? Ask: if it is important for people to have contact with the soil Is there a physical effect when people touch the soil</p> <p>2. What questions can be asked to the gardeners about esoteric literature? Do you use a moon calendar in order to sow? Do you feel the energy flow inside if you work in the vegetable garden?</p>	
	

14.00 Gilles Colinet, GxABT

Lecture: The step of the research process at Gembloux Agro-Bio Tech (GxABT). The future steps and the proposals for inclusion of elements about health.

Relationship between City-Dwellers and soils: How to use urban and peri-urban soils to face the urban challenge?

The reasons why people grow vegetables by themselves may be very diverse and collective gardens constitute one of the many answers of the Society to the need for food in quantity and quality. Urban areas often face specific problems compared to rural ones; they gather a lot of people with scarce access to a piece of land on the one hand, the soils often bear the footprints of past or current industrial activities and may present serious levels of harmful contaminants. Whatever their motivation, groupings of urban gardeners are numerous across Europe. Thousands of associations are reported by the International Office "Coin de terre et jardins familiaux". At least, 120 were identified in Walloon Region.

Within the project, the ULg GxABT research will focus on the links (i) between the socio-economical driving factors and the cultivation practices of the urban gardeners in collective gardens, (ii) between the human activities, the soil characteristics and the food quality, and (iii) between the physical environment of the gardens and the services to ecosystems and human health that they fulfill.

Three areas will be studied in Southern Belgium according to the distribution of the former industrial activities, and five other cities in Europe, with an overall aim which is to not only detect potential threats to urban gardening but to propose solutions for a sustainable use of urban soils. Who does what, where, when, how and why and how does that impact soil quality will be questioned through questionnaire and interviews, then soil characterization in selected study zones. The general methodology and tools developed in Southern Belgium within the POLLUSOL 2 project will be adapted. This project showed that soils from urban gardens showed regional chemical signature as a result of atmospheric contaminations by industrial activities. However, we found also important differences between gardens close to each other due to very different practices from gardeners. Regarding the influence of soil contamination on the presence of contaminants in the edible part of the vegetable, the POLLUSOL project, as well as experience reported in the literature, confirmed the big difficulty to establish generic relationships or models.

One challenging issue of the project will be to identify whether the collective characteristics does have an impact on the quality of the soil-plant-human system compared to findings observed from individual gardens.

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14.00 Romain Leyh, GxABT

Lecture: The results of the study: Characterization of collective gardens on the basis of social, agricultural and soil aspects in the Liege region. Knowledge development concerning the risks of metal contaminated soil.

In order to prepare the "Urban Soils" work package 3 "Perception and practices in Family urban agriculture", the team of Gembloux Agro Bio Tech designed a global overview of the situation in Liège for a master thesis. Liège was selected as a reference for its size, around 195.000 inhabitants, its variable soils types and its past industrial activities. The collective, non-commercial, urban agricultural systems were characterized there based on social, technical and soil aspects allowed a global overview.

About the social aspect, a series of open interviews emphasized the role of quality

vegetables production that sovereign gardeners practice as a leisure activity. The collectivity isn't a priority in Liège, gardeners are first looking for a piece of land.

Concerning technical aspects, a study by questionnaires showed that the gardeners make a non-valuable production for their own consumption. Questionnaires study also revealed that the gardeners use several techniques inspired from organic agriculture to achieve their requirements of quality. The use of organic fertilizer, from variable sources, is characteristic. The practices are oriented to recycling for example nutrient, water recycling.

Additionally to the interviews and the questionnaire. 46 soil samples from lots were collected in 13 sites.

Then standard fertility analyses were done by public laboratory. Soil analyses revealed organic matter rate from 3 to 20 % with a stable C/N ration around 13. The pH are generally between 6 and 7, the optimum interval, however few gardens do not fit into this optimum range. Although soil can be over fertilized in nutritive elements, the elements balance does not fit the vegetable nutritive requirements. Phosphorous is overloaded in many soils. That can be a consequence of over fertilization without enough precision.

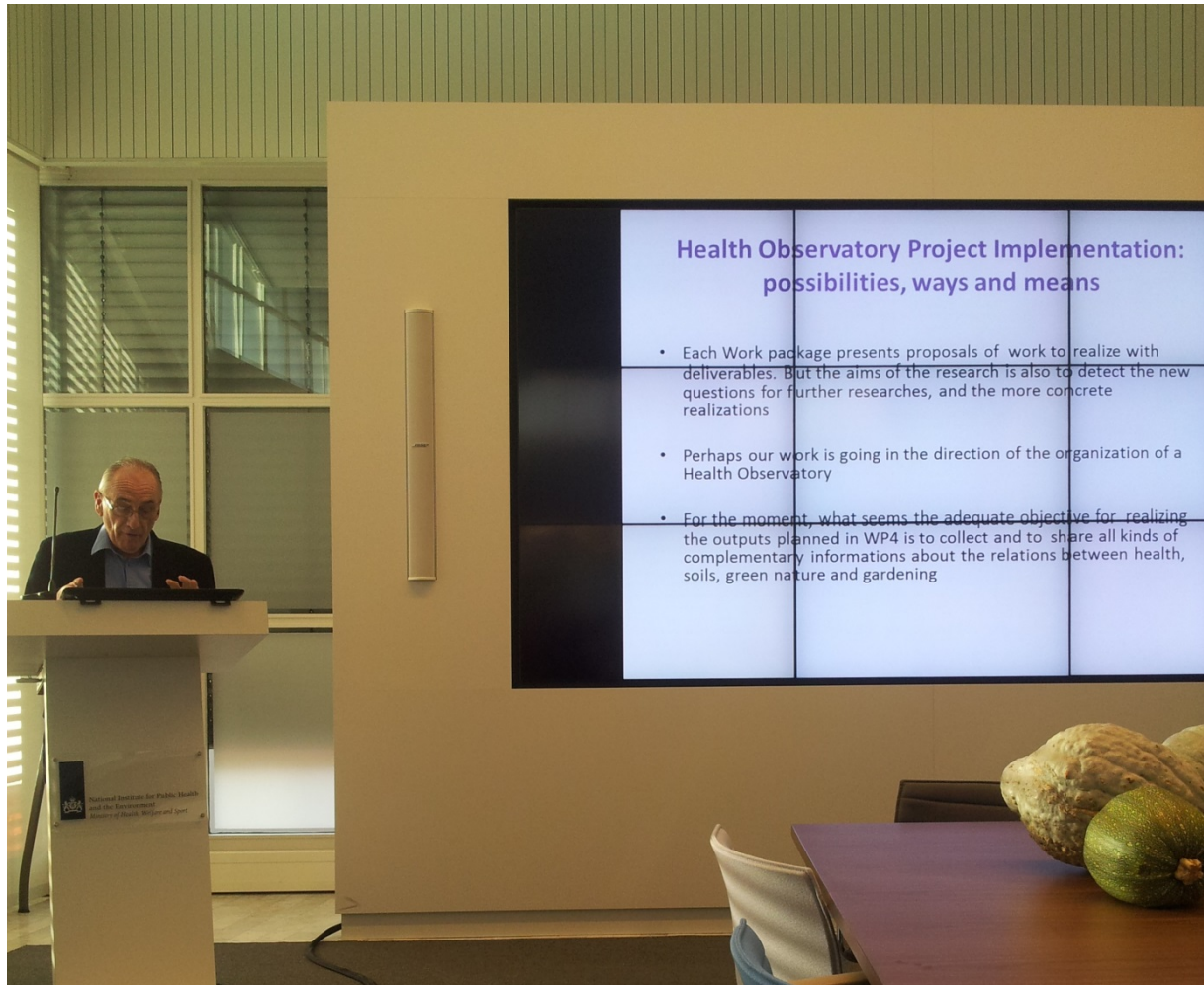
Soil contaminations were analyzed on the same soil samples. The soluble, available and total concentrations were measured at university. The analyses showed that Cd, Cu and Zn minimal rate measured in the gardens soils are higher than the overage rate of those elements in the Walloon topsoil. The rate of Pb highly varies between the sites. All the mean rates of the four elements are above the legal threshold in Wallonia (Cd > 1ppm, Cu>50pp, Pb>200ppm). The mean zinc soil concentration is even higher than the upper threshold in Wallonia (Zn>300ppm) over which an action is requested.

Additionally, some lettuces and strawberries cultivated on the collective gardens soils were analyzed. The results revealed that the lead concentration in the biomass is higher than the European threshold. However cadmium concentration remains lower than the threshold.

[SEE PDF: R-LEYH- VEGETABLES GARDENS AND SOIL ASPECTS.PPT](#)

15:10 Marcel Marloie, Louiza Boukharaeva, CNRS.

Soils, urban gardening and health: Further research tactics and Interviewing tools.
 Health Observatory Project Implementation: possibilities, ways and means.
 Dissemination project by a traveling exhibition (road show from place to place).



SEE PDF: M MARLOIE - FURTHER RESEARCH TACTICS AND DISSEMINATION.PPTX

15.40 hrs.	Workshop: Questions, commentaries and proposals from invitees Moderators Marcel Marloie and Piet Otte
16.10 hrs.	Conclusions and closing of the seminar Piet Otte and Louiza Boukharaeva