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Interactive comment on "Constructed Technosols are key to the sustainable development of urban green infrastructure" *by* Maha Deeb et al.

Maha Deeb et al.

mahadeeb.y@gmail.com

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We thank the reviewers for their comments on the manuscript. We have addressed all of their comments as described below, and feel that the manuscript is greatly improved as a result. Below, the reviewer's comments and our responses follow directly below each comment:

" Figure (2), with "Key fertility characteristics of constructed Technosols to be considered", is misleading and should be improved."

âĂć We have changed "square parks" to "parks and square lawns" and the "accompaniment of public buildings and traffic lanes" to "tree-lined streets". Moreover, instead of stormwater management, we decided to use the term "green buffers" in Table 1 and

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Figure 2. âĂć The “Maintenance” column has been deleted from Figure 2. âĂć A column for main fertility characteristics of the different wastes has been added to Table 2.

“It would be also useful to pinpoint limitations, as for instance ranges of concentrations of heavy metals or other pollutants of the different waste materials, which might counteract the achievement of the desired properties.”

More detail has been added to section 3.1.4. - Technical constraints to consider while constructing Technosols (line 241):

“Fresh organic waste can be problematic as it can have a toxic effect on plant growth (Yilmaz et al., 2016), sometimes by creating anoxic conditions. Thoughtful choices, e.g., using mature compost or mixing in mineral material that drains well (such as sand) can avoid anoxic conditions. Even with these choices, the addition of organic material must be specific to its intended land use as amending organic matter on a regular basis may lead to the accumulation of heavy metals over time. To mitigate this limitation, additional organic matter should be avoided over time to improve Technosol quality and maintain the integrity of established soils. If organic waste must be added, organic matter with heavy metal contamination and pollutants may be mixed with other nontoxic waste ingredients in calculated proportions to lower the overall concentration into acceptable ranges. These ranges will vary according to the land use and local regulations. For example, Total Petroleum Hydrocarbons should not exceed 5000 mg kg-1 as defined in the European Union (Pinedo et al., 2013). In New York City, heavy metals and organic contamination limits strictly depend on land use NY-CRR (2017).”

We did not list specific ranges for heavy metals and other pollutant concentrations because these ranges vary greatly depending on the limitations imposed by individual countries and even states. In the review, we make the case that materials should be clean to begin with. We also provided a citation that lists the concentration ranges of heavy metal and organic contamination limits for different land uses in New York City.

“The review could also include which were the mean physical, chemical and biological properties of the constructed Technosols described in the reviewed papers. Such a list could provide a reference for urban planners, on which values they should be expecting for the mentioned key parameters, when they use different waste materials. A question which was not sufficiently discussed is the proportions in which the different materials should be mixed, or the optimum thickness of the different layers, according to the different land uses. In general I missed more quantitative information or guidance, which I think the review of the different manuscript allows to do.”

âĂć We note that several specific examples of thickness and mixture ratios from literature are provided for each land use. However, as noted above, there is no universal formula for Constructed Technosols due to the complexities of local waste material, biotic choices (plants, macrofauna), and climate conditions. âĂć We also note that the current literature available is not extensive and does not allow us to draw general conclusions about waste ratio and thickness to provide a recipe that everyone can use.

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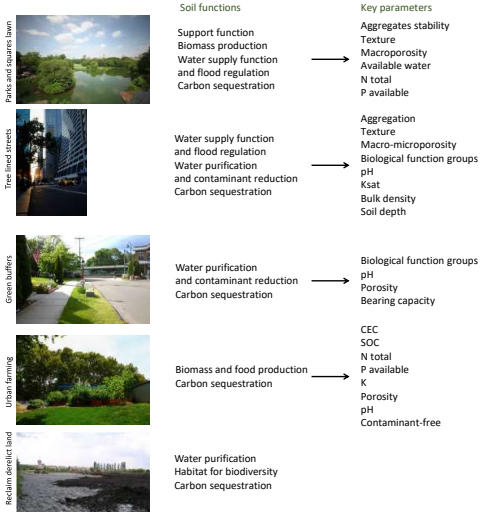
Soil functions
Key parameters
Parks and squares lawn
Support function
Biomass production
Water supply function
and flood regulation
Carbon sequestration
Aggregates stability
Texture
Macroporosity
Available water
N total
P available
Tree lined streets
Water supply function
and flood regulation
Water purification
and contaminant reduction
Carbon sequestration
Aggregation
Texture
Macro-microporosity
Biological function groups
pH
Ksat
Bulk density
Soil depth
Green buffers
Water purification
and contaminant reduction
Carbon sequestration
Biological function groups
pH
Porosity
Bearing capacity
Urban farming
Biomass and food production
Carbon sequestration
CEC
SOC
N total
P available
K
Porosity
pH
Contaminant-free
Reclaim derelict land
Water purification
Habitat for biodiversity
Carbon sequestration

Fig. 1.