

Klíma és környezetvédelem új megoldási  
lehetőségei három doktorandusz munkája  
alapján

Dr. Nagy Imre, egyetemi tanár,  
Újvidéki Egyetem

# Environmental Protection and Climate Change with Black Soldier Fly



# Introduction

Insects could convert

**1.3 billion**

tonnes of biowaste per year into protein



1

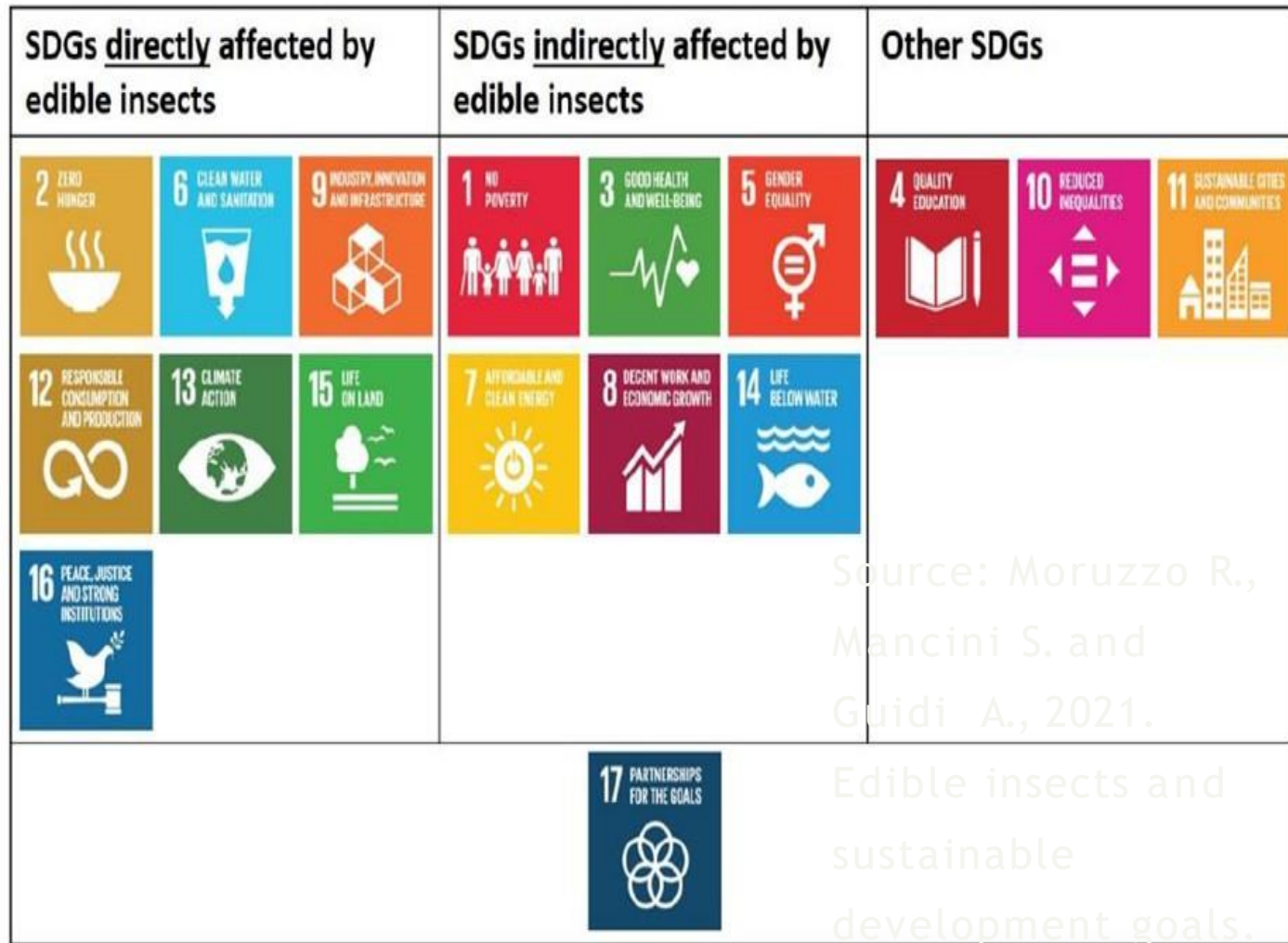


2



3

# Introduction



Source: Moruzzo R., Mancini S. and Guidi A., 2021.

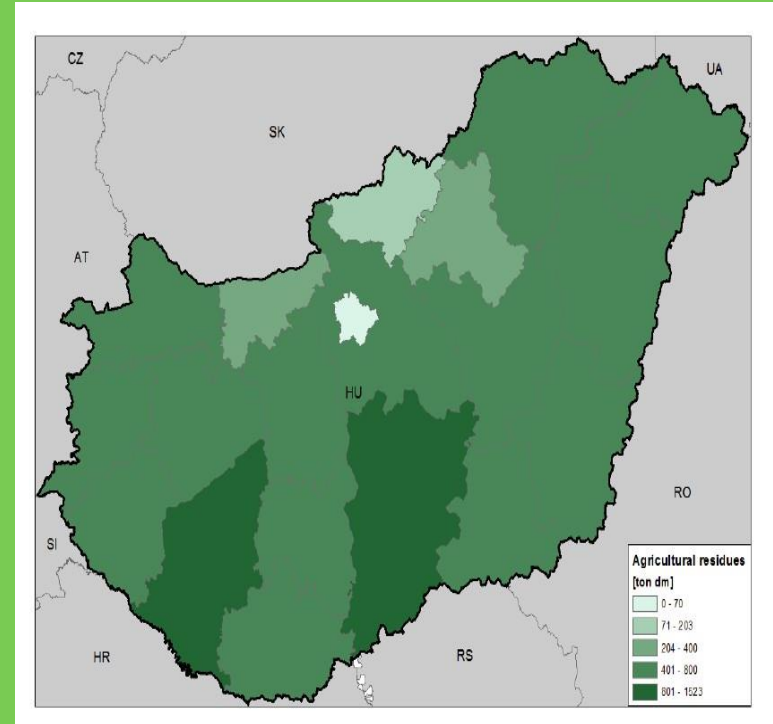
Edible insects and sustainable development goals.

Insects, 12(6), p.557.

Figure 1. Interaction map between insects and sustainable development goals.

# Introduction

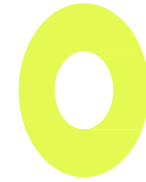
	Residues from vineyards	Residues from fruit tree plantations (apples, pears and soft fruit)	Total
Budapest	0	1,165	1,165
Pest	0	14,163	14,163
Fejér	0	2,447	2,447
Komárom-Esztergom	0	1,271	1,271
Veszprém	0	2,327	2,327
Győr-Moson-Sopron	0	3,894	3,894
Vas	0	3,123	3,123
Zala	0	3,502	3,502
Baranya	0	2,612	2,612
Somogy	0	3,456	3,456
Tolna	0	2,185	2,185
Borsod-Abaúj-Zemplén	1	6,160	6,161
Heves	0	3,093	3,093
Nógrád	0	2,162	2,163
Hajdú-Bihar	0	14,633	14,633
Jász-gykon-Szolnok	0	13,152	13,152
Szabolcs-Szatmár-Bereg	0	13,944	13,944
Bács-Kiskun	1	17,194	17,194
Békés	0	11,469	11,469
Csongrád	0	8,681	8,682
Total	6	130,633	130,638



Source: Hunyadi B. et al., 2021.  
 Country Report On  
 Sustainable Biomass  
 Assessment Hungary. ISBN  
 978-615-6062-01-7

Hungary is potential for Black Soldier Fly

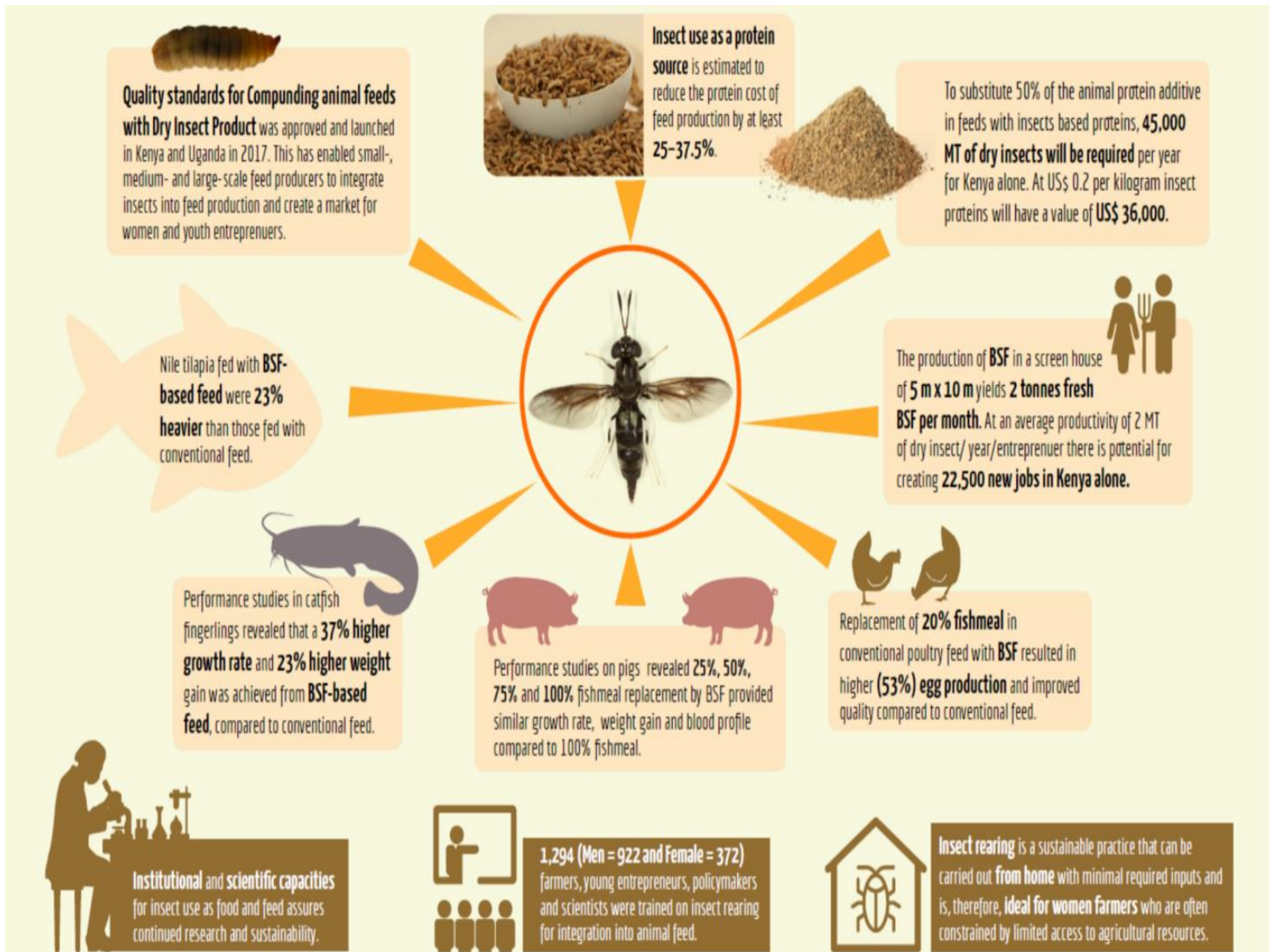
# Description of Black Soldier Fly



- Native to many places around the world and can adapt to various climates
- Larval form eats food waste, consume ~95% of food waste
- Larvae live long, feed for ~2 weeks
- Great food source for livestock
- Adult form has no mouth
- Adults do not live long, about 5-8 days
- Main goal for adults is to reproduce

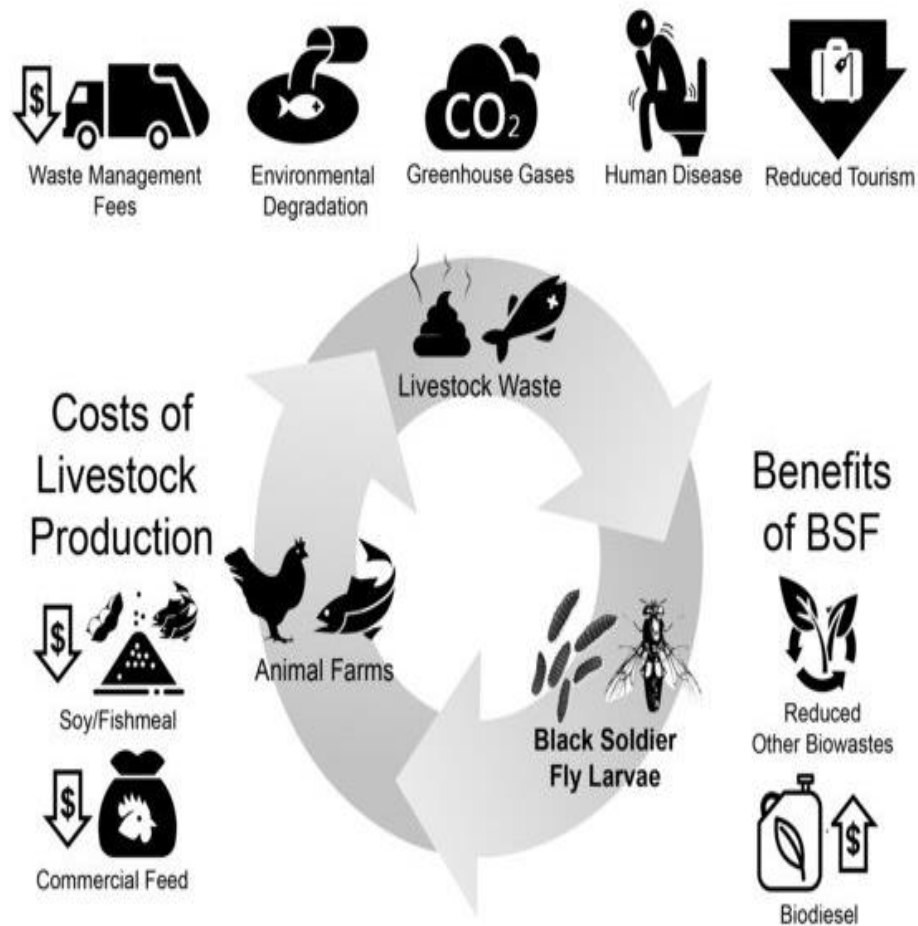


# Benefit of Black Soldier Fly





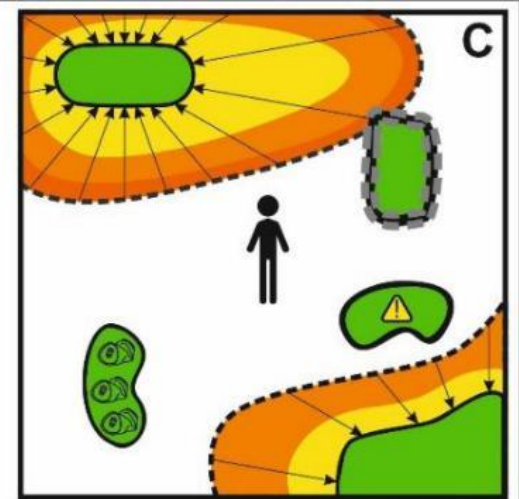
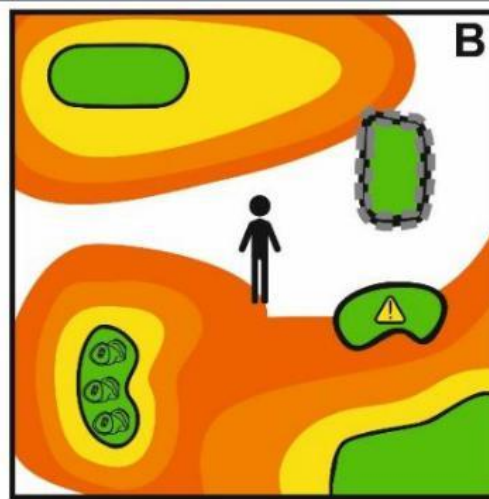
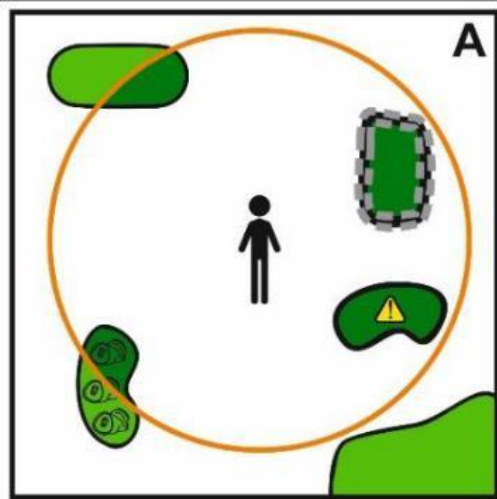
# Impact of BSF in Environment



The closed-loop cycle of using black soldier flies (BSF) to process organic waste, including livestock waste itself, into livestock feed. Includes the costs of livestock production and livestock wastes, which would be reduced by BSF production, along with other benefits of BSF rearing.



**Városi lakosság zöldfelület  
ellátottságának értékelése  
geoinformatikai módszerekkel  
Szeged és Zalaegerszeg példáján**



Referenciapont  
(egén, lakóhely, stb.)



Zöldfelületek



Elérhető zöldfelület



Elérhetőség elemzés övezete



Hozzáférhető 2 percen belül



Hozzáférhető 5 percen belül



Hozzáférhető 10 percen belül



Kerítés/fal



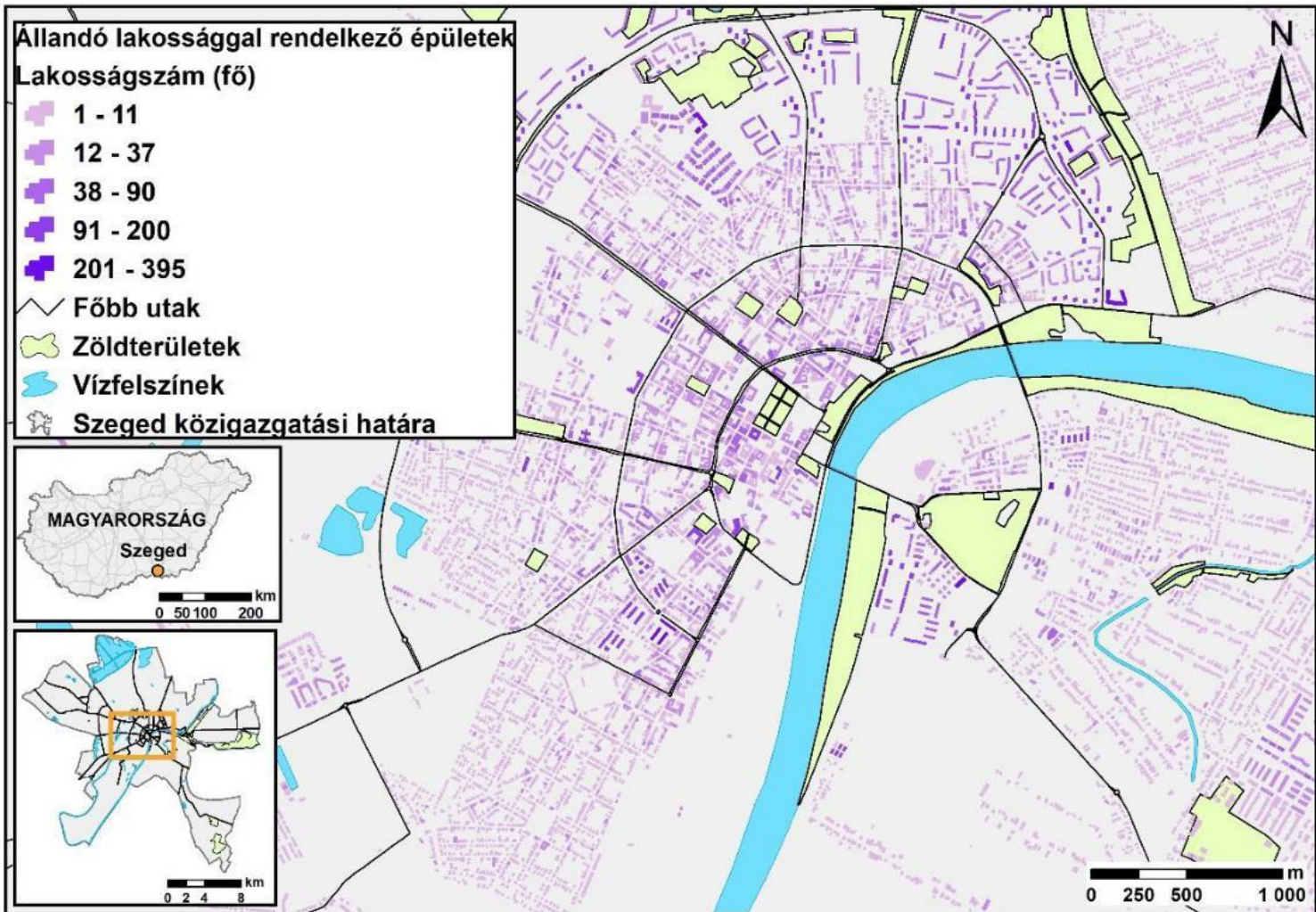
Vélt vagy valós veszélyek

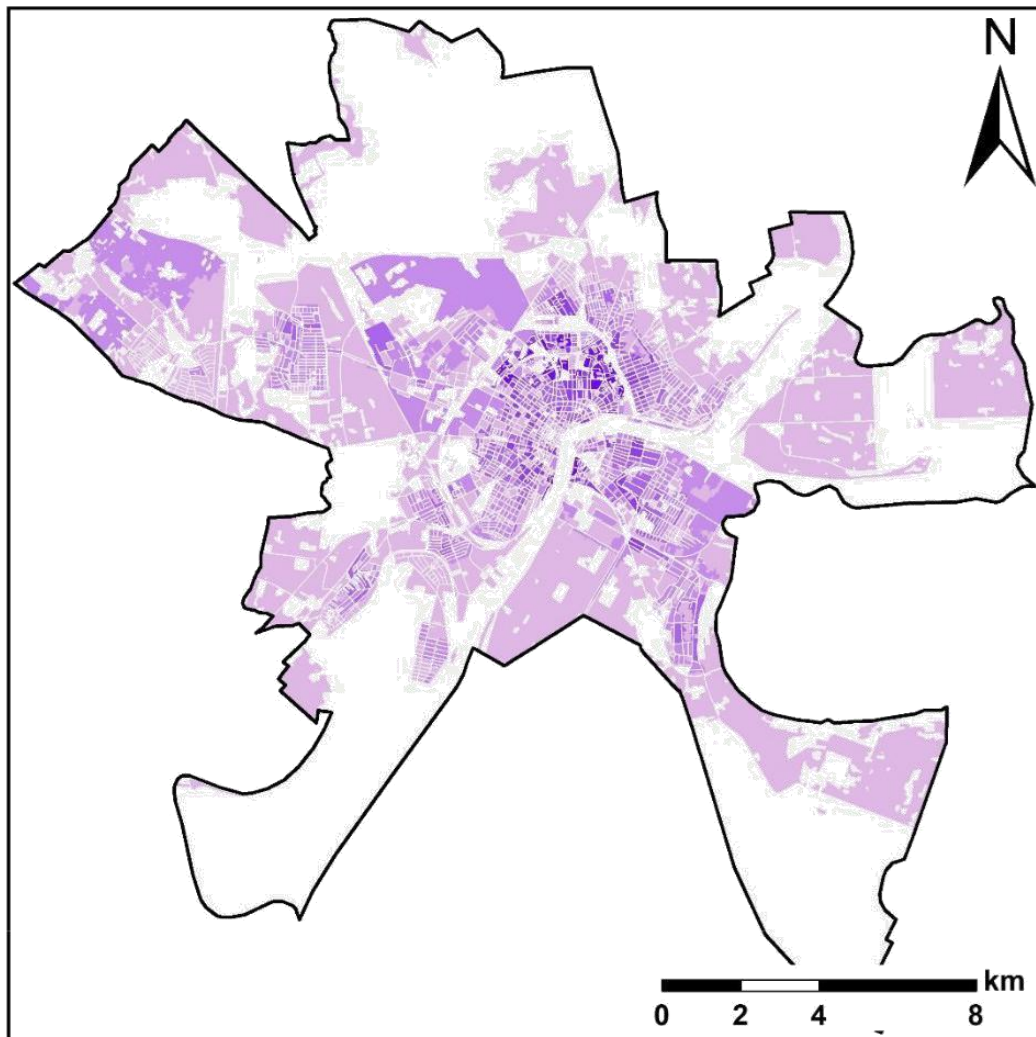


Vonzáskörzet



Szemetes/rendezetlen  
környezet

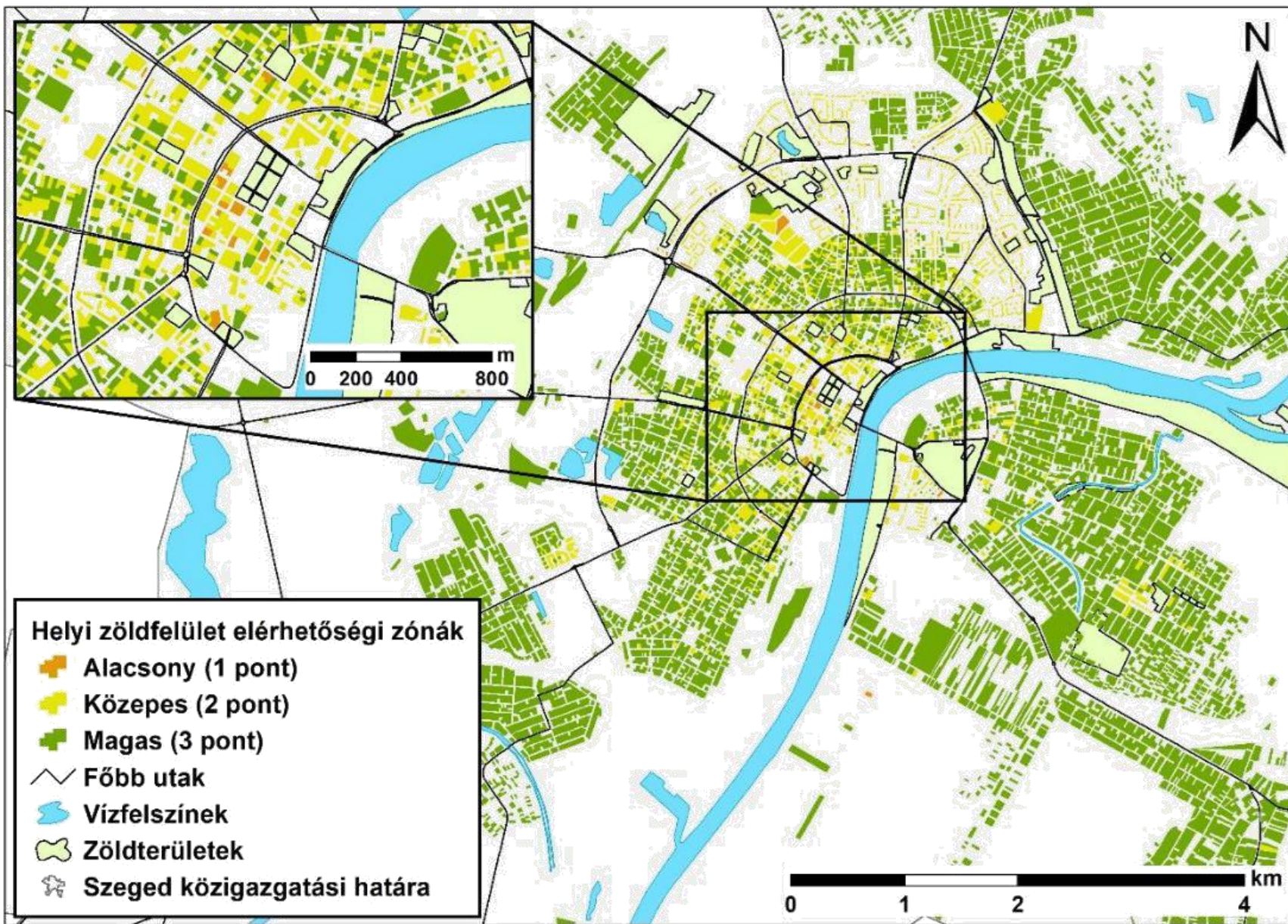




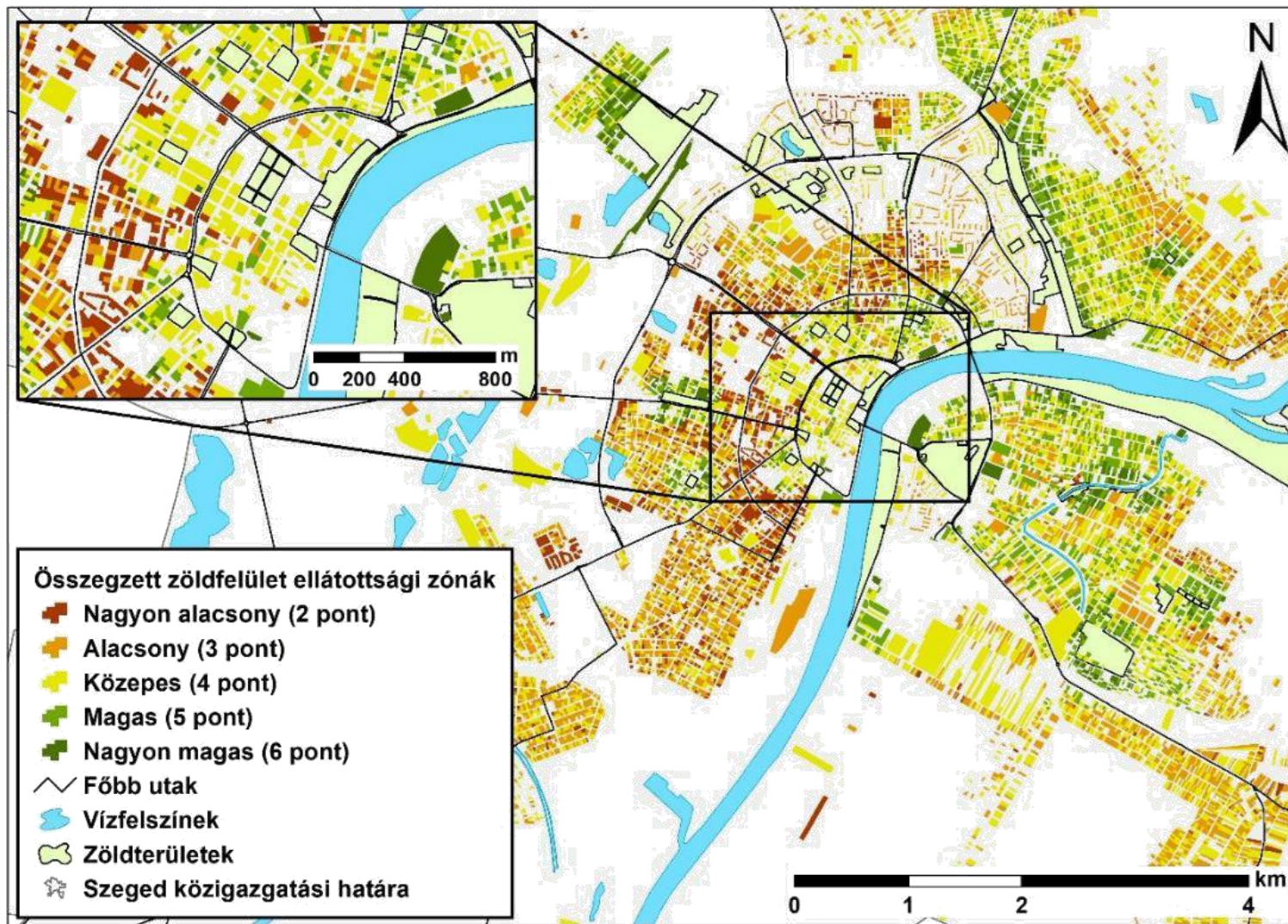
### Lakosságszám (fő)

- 0
- 1 - 40
- 41 - 134
- 135 - 292
- 293 - 660
- 661 - 1515









# Environmental Management of Urban Sprawl in Amman City- An Analysis Based on the Land Cover, Remote Sensing and Econometric Analysis





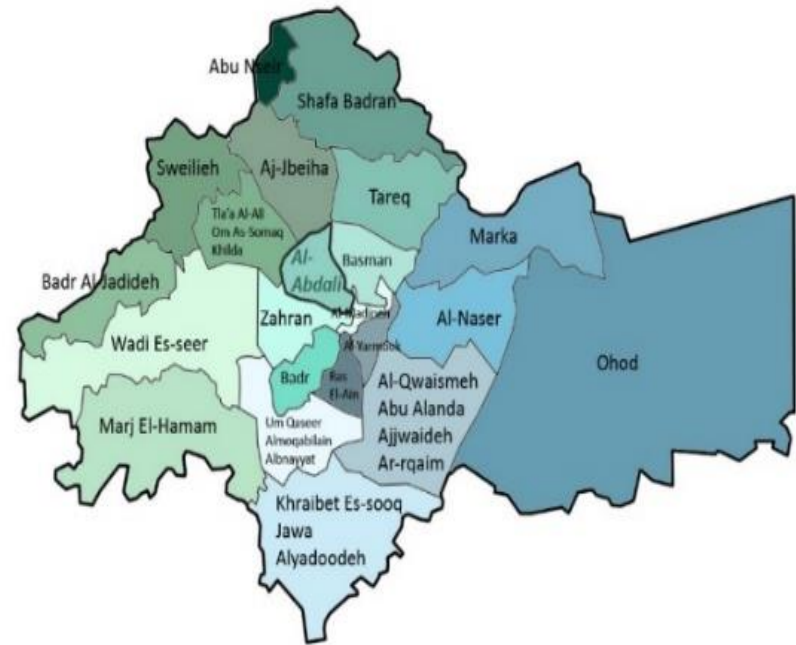
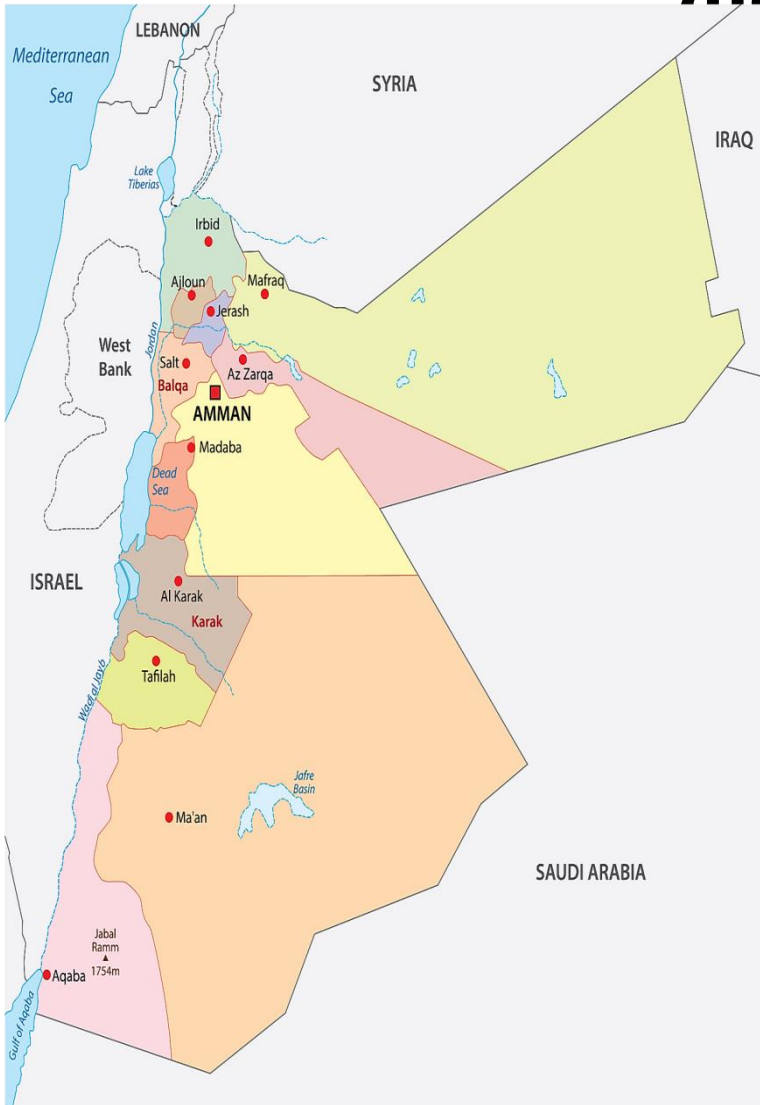
# Background

- Amman population in 1920 versus nowadays.
- Despite the serious efforts by the government to control urban growth, urban challenges were still widespread in Amman.
- Influx of refugees since 1948 (Palestinian, Iraqis refugees, Syrian refugees).
- Experienced unplanned exponential urban growth.
- 43% of Jordan's total population.
- Unplanned developments.
- Insufficient urban legislation.
- Past poor management, weak governmental long-term planning policies, and lack of unbiased scientifically driven decision-making process contributed to urban sprawl.

## **The implications of urban sprawl in Amman can be summarized as:**

- Water shortage.
- Deterioration in agricultural land and few green spaces (3.95%).
- High price of land and housing.
- Low quality services in several parts in the city.
- Road congestion and poor public transportation even after implementation BRT
- Pollution (vehicular carbon emissions).
- High energy consumption for commuting and residential.
- Informal settlements.

# Study area: Amman city and its districts



# Problem Statement

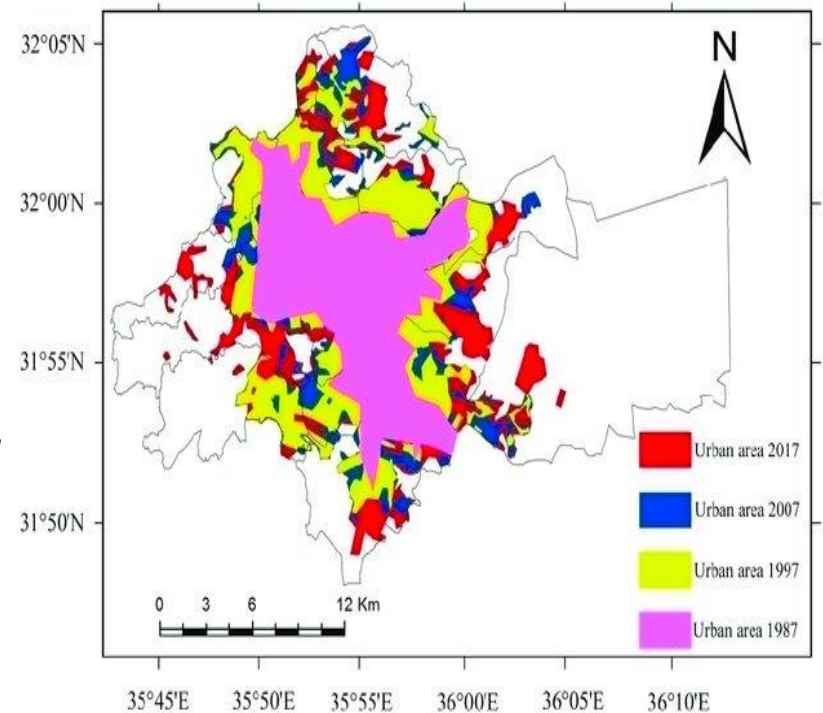
## Amman's annual urban growth

Year      Urban Area (km<sup>2</sup>)      Annual Growth(%)  

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1987	147.08	—
1997	195.98	3.33
2007	214.94	0.97
2017	237.86	1.07

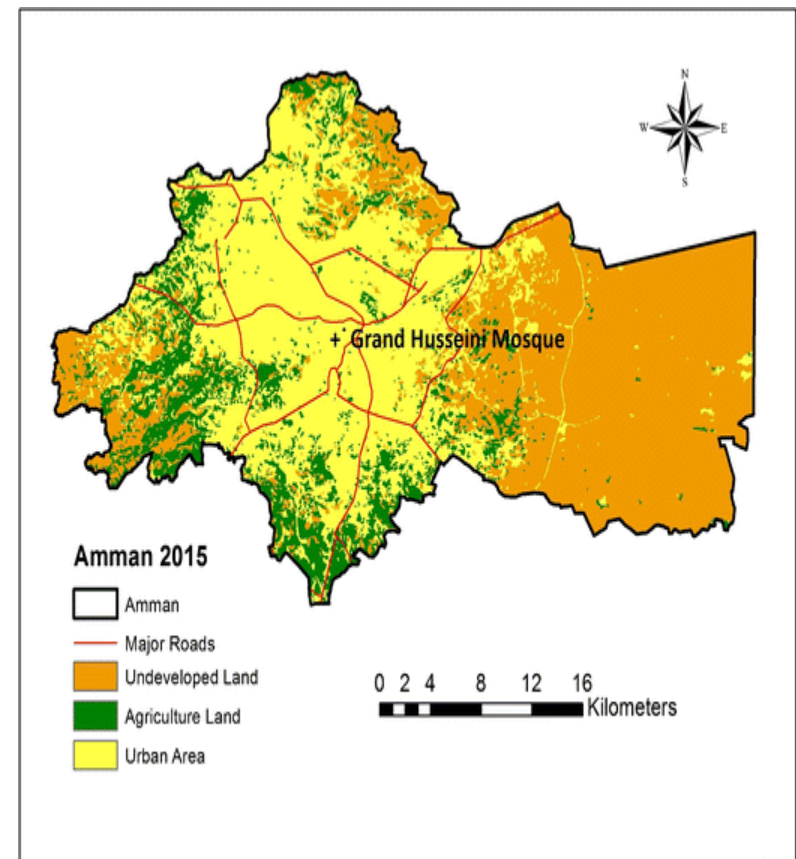
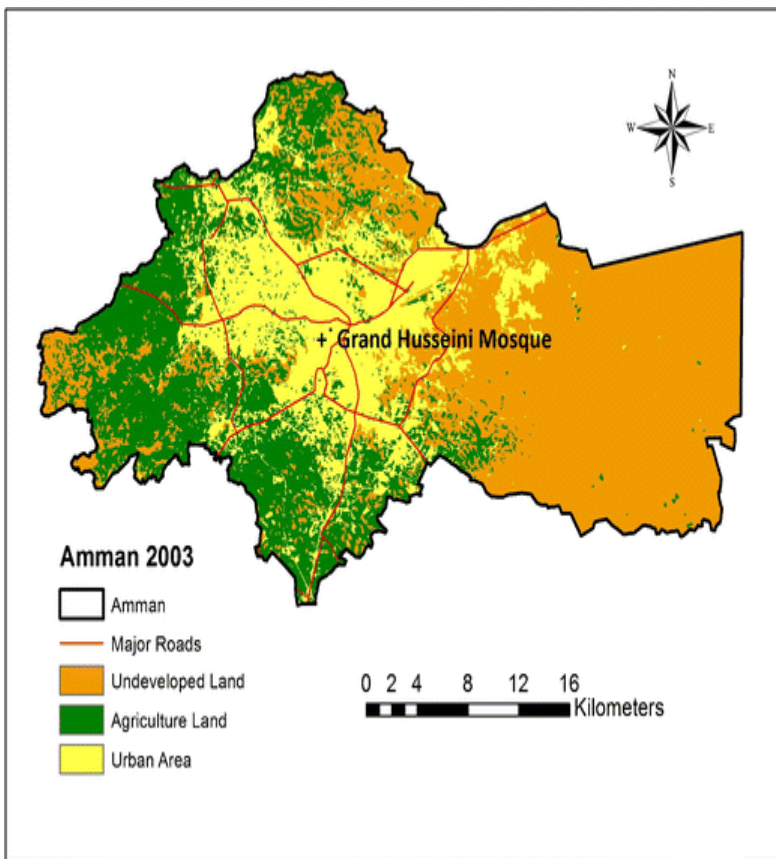
Amman population density (1990-2017):



Source :Al-Bilbisi, 2019

**Amman city comprises an area 794.6 km<sup>2</sup>**

**Urban area now 293 km<sup>2</sup>.**



- **The rate of losing agricultural lands because of urbanization is increasing in an alarming rate.**
- **For a period of 12 years (2003–2015), 50% of the agricultural lands of Amman were converted into urban lands (Al-Kofahi et al., 2018).**
- **Compared with the period between 1918 and 2002 Amman lost 4.23% of its agricultural land (Al-Bayoumy et al., 2006).**

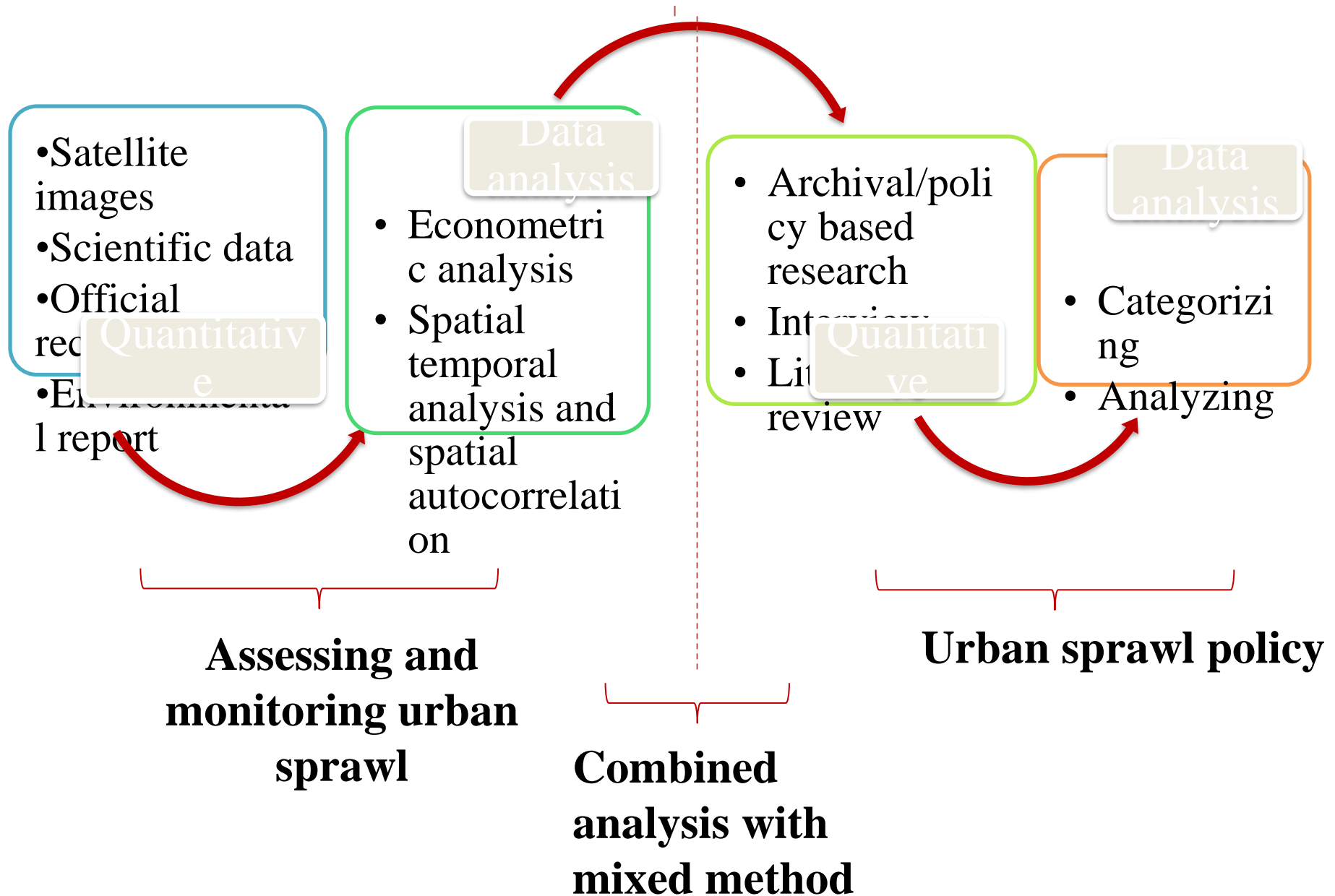
**Aim: To fill the gap with a broader agenda of understanding the role of urban sprawl and its impact on Amman city, in the agglomeration of an economically growing regional center. The research explores what is unsustainable due to urbanization and urban growth toward achieving SDG11 by urban environmental management.**

**1-To understand the environmental consequences of the urban sprawl**

**2-To understand the connections between excessive urban space expansion and environmental degradation.**

**3-To examine the multi-scale environmental urban planning and policy in Amman city toward achieving environmental sustainability goals of the city.**

# Methodology



# Research gap and Contributions

- **This Thesis trying to fill the research gap from the following perspectives. To begin with,**
  - 1. Put urban sprawl and environmental pollution in the same framework, and theoretically explore the correlation between them.**
  - 2. Mix non spatial econometric analysis with LULC analysis for Amman.**
  - 3. Empirically examine the impact of urban sprawl on environment.**
  - 4. Connect urban sprawl and energy consumption.**



# **Conclusion & Expected result**

- Within this proposal's capability, the study's objectives seem to be achievable with the hope that continuing this project could validate this claim through statistical analysis and remote sensing.**
- This study may contribute to the measurement and assessment of sprawl, If the results of the indicators validate theoretical findings and recordings for urban sprawl in Amman .**
- A study at the single city scale can provide more accurate results and can be used to formulate policies that conform to the City specifically.**
- Providing critical data to improve Amman urban planning.**

# Preliminary Result

Journal description	Result	Status
<p>Abdeljawad, N., &amp; Nagy, I. (2021b). Urban Environmental Challenges and Management Facing Amman Growing City. REVIEW OF INTERNATIONAL GEOGRAPHICAL EDUCATION ONLINE, 11(5), 2991–3010. MTMT. <a href="https://doi.org/10.48047/rigeo.11.05.192">https://doi.org/10.48047/rigeo.11.05.192</a></p>	<ul style="list-style-type: none"><li>• Urban environment management aims to mitigate the adverse impacts of rapid urbanization.</li><li>• This paper's scope and aim are to present the scholarly literature on urban environmental management in Amman city concerning coping with environmental risks and challenges and the importance of urban planning and initiatives for environmental sustainability and the well-being of citizens.</li><li>• This paper discusses the GAM's environmental problems, potential mitigating strategies, and the effects of population growth and urbanization during the past decade. Traffic congestion and pollution are two additional significant problems in GAM.</li></ul>	<p>Published</p>

# Other Expected paper to be published

- **Evaluation of urban land use-related Policies to reduce Urban sprawl environmental consequences in Amman city, Jordan compared with other two cities-inductive methods toward sustainable urban**
- **Managing, Assessing, and monitoring urban sprawl using remote sensing; change detection; Urban Expansion Intensity Index (UEII); and Shannon entropy: A case study of Amman city, Jordan (1990–2022)**
- **Environmental impacts of Urban sprawl on Vegetation and land surface temperature/ urban heat island using normalized difference vegetation index NDVI and LST: The case of Amman city (1990–2022)**
- **Effect of urban sprawl on environmental problem for Amman City (Using econometric analysis)**