SMU**R**BS

SMart URBan
Solutions
for air quality,
disasters and city
growth

City growth component:

Migration

Dr. Palma Blonda*,

*CNR-IIA; NOA; HZG; AoA; AUTH (Task 5.4)

SRI; ROSA; ISPRA (Task4.3)

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Context and motivation (1)

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MIGRATION

119,046 people have arrived in Europe by sea in 2017, while 2,420 died or went missing on the way

dinated migration flows

...e in the area of immigration

Urban Resilience

Social Resilience

Refugees and police face each other. Photograph: Angelo Carconi/AP

Many child refugees spend sleepless nights in tent

Riot police clashed with protesters during a rally against the Austrian government's planned reintroduction of border controls at the Brenner Pass last year. Photograph: Jan Hetfleisch/EPA
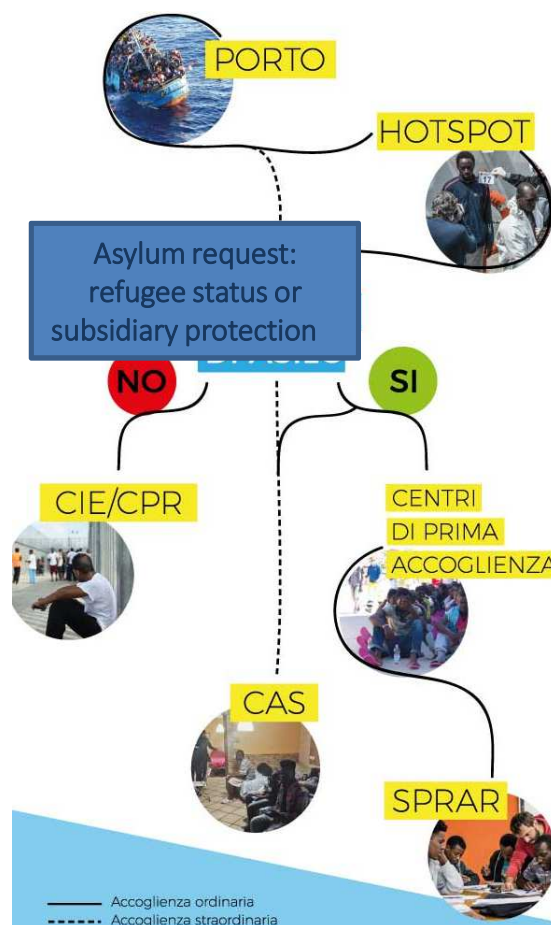
Context and motivation (2)

- Are European governments prepared to meet the demands this exodus (up to 100 million migrants) would bring about?

Gaps/needs:

Decision makers and humanitarian organizations need more *in-depth territorial information* and *strategic plans* to face effectively new social, cultural, medical and economic challenges posed by such an epochal event.

Overall Objective: Provisioning of dedicated services:

To prepare for, withstand and respond faster to

a growing migration pressure by

assessing levels of urban sustainability and resilience (T3.2, T4.3; T4.4, T5.5; T6.1; T7.4)

Approach and expected outcome

- Urban Ecology concepts (Formann, 2008; 2014):

  - Urban regions (UR): areas where a city and its surroundings (150 to 200km diameter) interact to form a functional region.

  - UR include patches, corridor and matrix. 3D edges, with ecological significance

    - ✓ structure: spatial arrangement

    - ✓ function: refers to the flows among organisms, *source and sinks,* built structure and the physical environment (soil, water and air) where communities dwell. *Not LU, but flows among the land uses.*

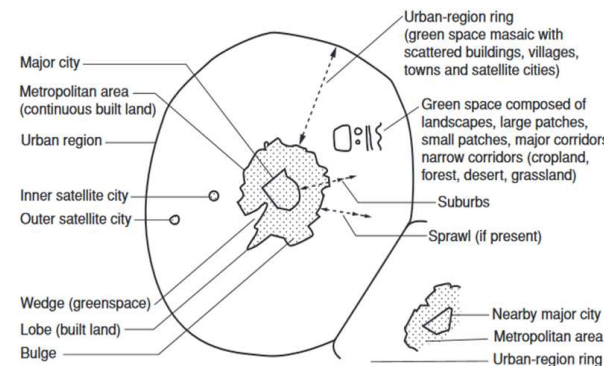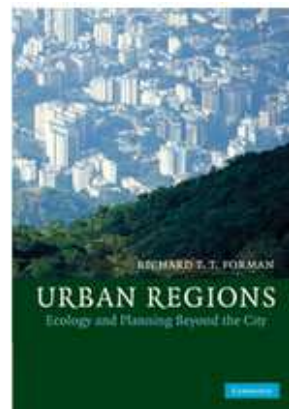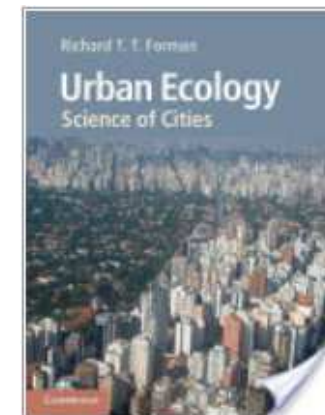   - ✓ changes: refer to alterations in structure as well as in functioning

Figure 1.2 Concepts and terms for urban regions.

Labels: Major city; Metropolitan area (continuous built land); Urban region; Inner satellite city; Outer satellite city; Wedge (greenspace); Lobe (built land); Bulge; Urban-region ring (green space mosaic with scattered buildings, villages, towns and satellite cities); Green space composed of landscapes, large patches, small patches, major corridors, narrow corridors (cropland, forest, desert, grassland); Suburbs; Sprawl (if present); Nearby major city; Metropolitan area; Urban-region ring

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Credits: Urban Ecology (R.Formann, 2014)

Spatial patterns and flows (both natural and human), linking organisms, built structures, and the physical environment highlight a treasure chest of useful principles to improve urban areas for both nature and people (Formann, 2014)
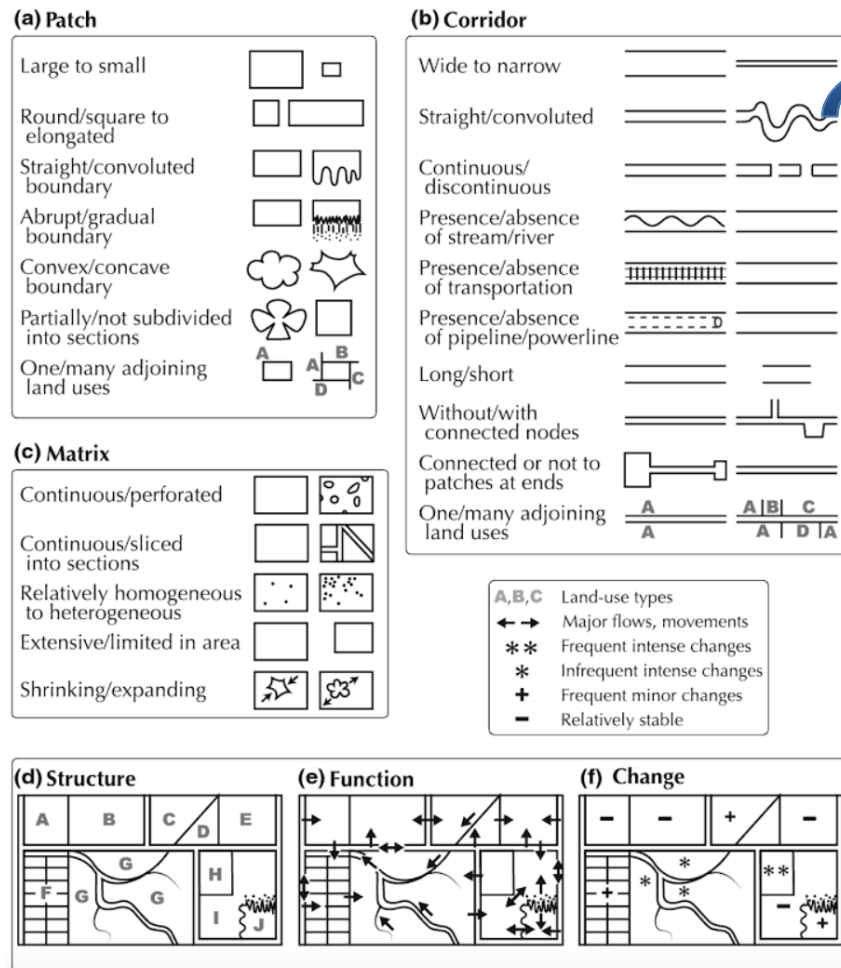
Resilience

- Not only Land Use (LU) and LU changes

- Map the flows between LU and make the thickness of the edges proportional to flow rate;

- The flow-map would highlight areas of major and little interaction among sites;

- Such studies would be useful for spatial planning and resilience evaluation.

Approach and expected outcome

- **Urban cities as ecosystems.** Such model has emerged in the understanding on natural and human patters and dynamics on the land as well as for societal problem-solving.

- A huge city population depends daily on resources produced mostly outside the urban area. *Thus, preservation of such resources, i.e., urban biodiversity, air, water, soil and food quality, is mandatory.*

- Unwise and delayed sustainable management of such resources may induce new poverty in cities with negative impact on the environment:

  severe deforestation, due to fire-wood shortages, land degradation, unsustainable groundwater extraction, and groundwater pollution, waste management, have already been observed in the surroundings of many migrants camps.

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OBJECTIVES

- Operational objectives include the development of:
  - new downstream services, defined in W2 and produced in WP3, WP4, WP5
  - urban essential variables and indicators (including relevant SDG);
  - tools to identify new <u>safe and healthy</u> potential sites, required to locate migrants/refugees camps with adequate facilities, which are well integrated with existing local services;
  - a citizen-science approach to interact with relevant stakeholders and provide measurements of the status of selected areas;

- Identification of urban and social resilience boundaries through modelling (Task 5.4, Task 4.3)

These products would support the effective coordination and integration of local and European actors by expanding existing strategies and procedures aimed at shielding migrants and citizens. They would also mitigate environmental, cultural, social and health impacts.

State-of-the-art: tools and EO data

- Knowledge/models from on-going and previous projects:
  - ECOPOTENTIAL: urban ecosystems and ecosystem services monitoring.
  - FP7 BIO_SOS and MsMonina: biodiversity monitoring by VHR
  - FP7 ConnectinGEO: EVs identification
- Multi-source EO data (e.g. in situ, RS, citizen observatories, UAVs) for detecting spatial patterns and flows (T3.2)
  - dense time series of HR images to detect landscape dynamics
  - VHR data will to extract variables and indicators at local level
- Copernicus services
- Global Human Settlement Layer (GHSL)

Type of action: ERA-NET-Cofund
Grant agreement no: 689443
Proposal acronym: ERA-PLANET
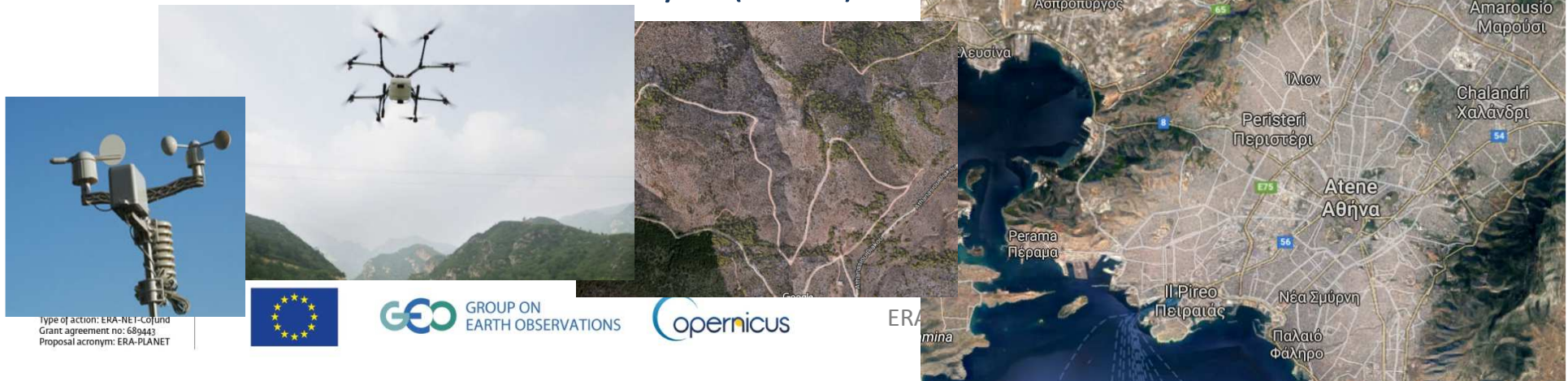
Progress beyond the state-of-the-art

- Further advancements within SMURBS of the knowledge based system for LC/LU mapping: from FAO-LCCS2 to object oriented FAO-LCML) (T3.2);

- Semantic analysis of the resilience concept;

- Resilience indicators identification and extraction (T4.3);

- Models to assess levels of resilience (T5.4) and

- Tools for the implementation of urban ecology concepts;

- Synergies with national /regional data hub (T7.4)

- Synergies between local platform/services and SMURBS services (T6.1) to foster open access to data and knowledge

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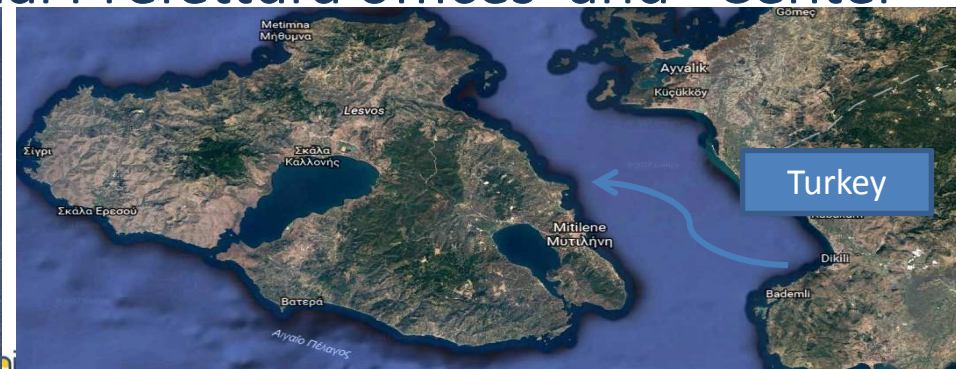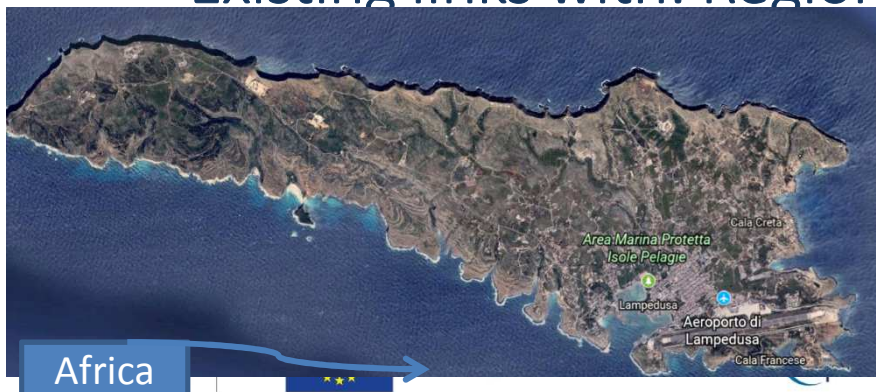
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State-of-the-art: city examples

- Three Case Study, i.e. Lampedusa and Bari (I) and Mytilini in the Aegean see (GR), will be considered to address migration pressure

  – Lampedusa: lack of health services and drinkable water, a waste management system as well as jobs for young people (M. Minniti, July2 017)

  – Mytilini: a reception and identification centre. It is close to Lesvos where about 4.521 migrants live in a hotspot centres (i.e.,Moria).

- One Pilot, i.e. Athens (GR) will be considered to address multiple interconnected pressures by EO, in-situ and COs data.

- Existing links with: Regional Prefettura offices and Center

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Tangible outcomes - Deliverables

WPs	Title	Tasks	Deliv.	
WP2	User needs and gap analysis	T2.1 T2.4	D2.1 D2.3	User needs report Gap analysis
WP3	EO and CO collection and analysis	T3.1 T3.2	D3.1 D3.2	In situ platforms implementation; Satellite data collection and analysis
WP4	Added Value products	T4.3 T4.4 T4.5	D4.3 D4.4 D4.5	Urban growth (migration) products EVs and indicators Exploitation plan of Copernicus serv.
WP5	Smart City pilots and case study	T5.4	D5.4	EO in migration case studies: successes and failures

- Partners involved: CNR, NOA, HZG, AoA, AUTH, ROSA

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"Take-home" message

- Unwise and delayed sustainable management of natural resources may induce new poverty in cities with negative impact on the environment:
    - *severe deforestation, due to fire-wood shortages, land degradation, unsustainable groundwater extraction, and groundwater pollution, waste management, have already been observed in the surroundings of many migrants camps.*

- Strong interactions and coordination between SMURBS and local/regional/national/European players should be promoted in order to:
    - Delineate the role that multi-source EO data may have in migration crisis management;
    - Foster the interaction of interdisciplinary domains to reduce poorly organized measurements and unwise decisions by supporting the concept of smart and informed cities;
    - Foster citizen participatory mechanisms to build urban and societal resilience on migration induced pressures
    - Foster high quality life for both migrants and locals.

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