

Ladies and Gentleman, I am Luca D'Acci, the Head of Urban Environment and Climate Change at IHS.

女士们，先生们，我是Luca D'Acci，IHS城市环境与气候变化项目的负责人。



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In small multifunctional settlements the maximum commute can be done by walking or biking

在小型的多功能生活区内  
所有通勤可由步行或骑车实现



An aerial photograph of a vast, densely populated city, likely a megacity. The image shows a dense grid of buildings and infrastructure, with a few prominent skyscrapers in the distance. Overlaid on the image are several thick, black, hand-drawn arrows that originate from the top and point towards various parts of the city, suggesting movement or flow within the urban environment.

在大城市内，一般通勤意味着交通堵塞、污染、耗时、大面积的土地用于道路建设以及交通工具





Commuting within multifunctional small settlements

# 在小型的多功能生活区内的通勤



Commuting within megacities

# 在大城市里的通勤





# 小型生活区中的土地使用



Land use in multifunctional settlements



# 大城市中的土地使用



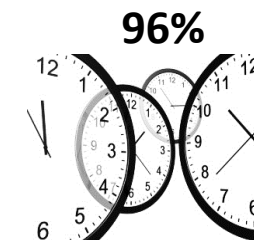
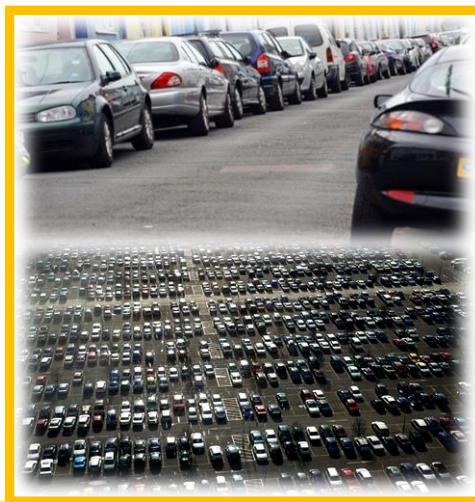
Land use in megacities





Cars cover more than **20%** of a city's surface, but are in use only **4%** of the time, and much of that time is spent stuck in traffic or searching for parking

汽车占据20%的城市空间，可是每天的平均使用时间只有4%，在每天不到一个小时的使用时间里，多数时间还是被消耗在交通堵塞和寻找停车位上





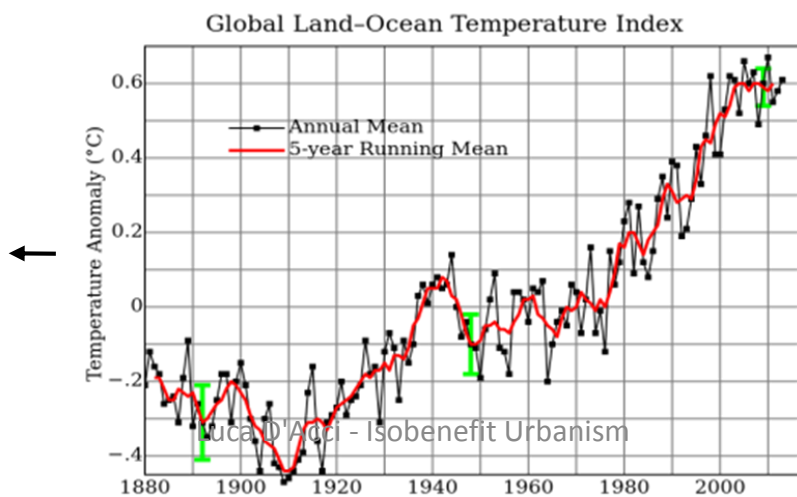
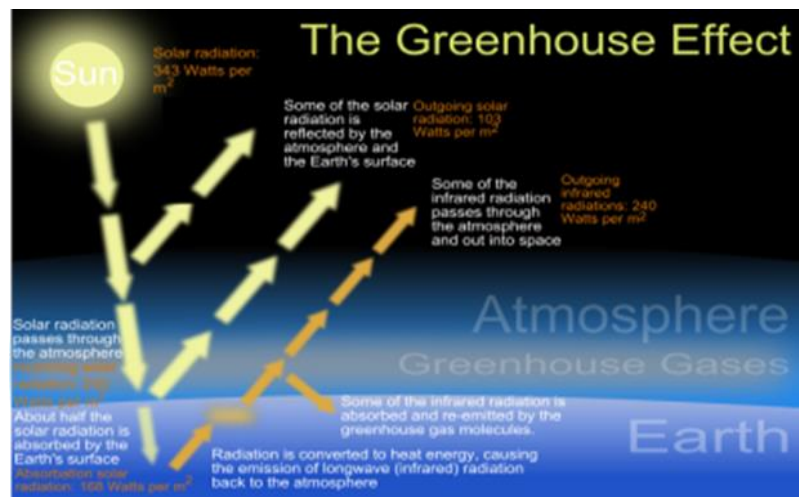


Transportation: **33%** of GHG Emission

交通运输：带来了  
33%的温室气体排放

Cars account for **over half** of the emissions from the  
Transportation sector

汽车尾气排放对运输  
行业总排放物的贡献  
超过一半





# 经济成本



Congestion costs: **3,4% of GDP** in Buenos Aires, 2,6% in Mexico City, 1% in Europe.

堵塞成本：占GDP 的 3.4% ——布宜诺斯艾利斯，占GDP 的 2.6% ——墨西哥城，占GDP 的 1% —— 欧洲



Total costs of **motorised transport**, including air pollution and congestion: in Beijing **7,5-15% of GDP**.

北京机动运输工具的总成本（包括污染和堵塞成本）：  
占GDP 的7.5-15%



# 经济成本



Pollution related health costs: **5% of GDP** in cities in developing countries, over **90%** of which can be attributed to **vehicle emissions**



由污染造成的健康成本：相当于发展中国家中5%的GDP，其中90%的污染源来自于机动车尾气

Urban road accidents in developing country cities alone cost **2% of GDP**



发展中国家的城市道路交通意外成本：相当于GDP 的2%





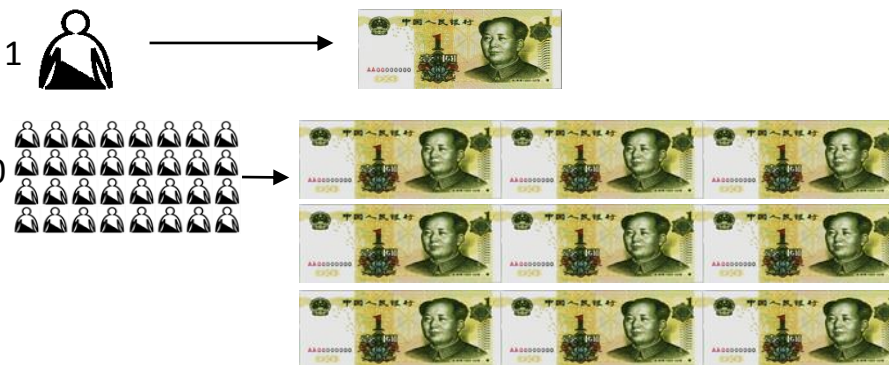
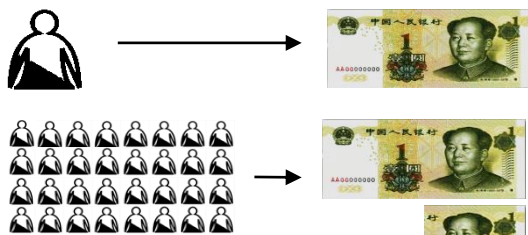
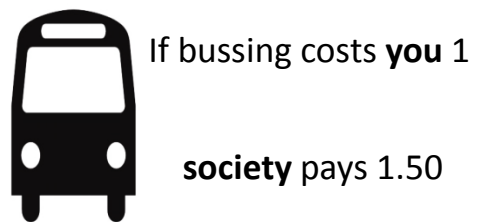
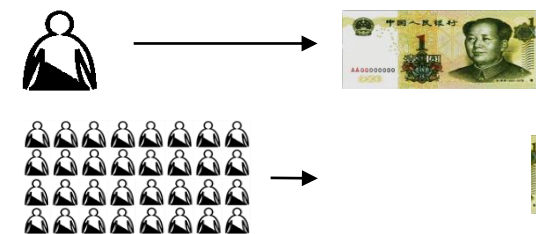
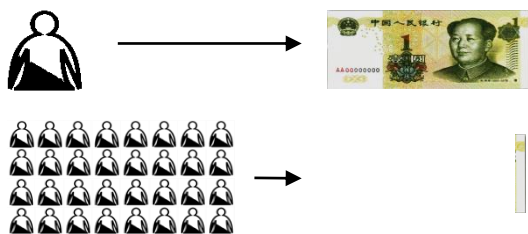
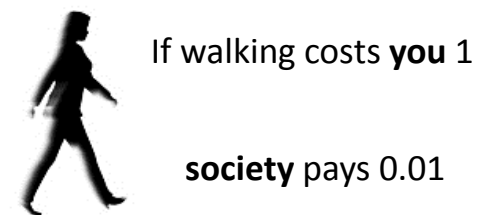
Economic costs

# 经济成本



Social costs of road transport in OECD countries, China and India: \$3,5 trillion/year

## OECD国家道路交通的社会成本—中国和印度：3.5万亿美元/年



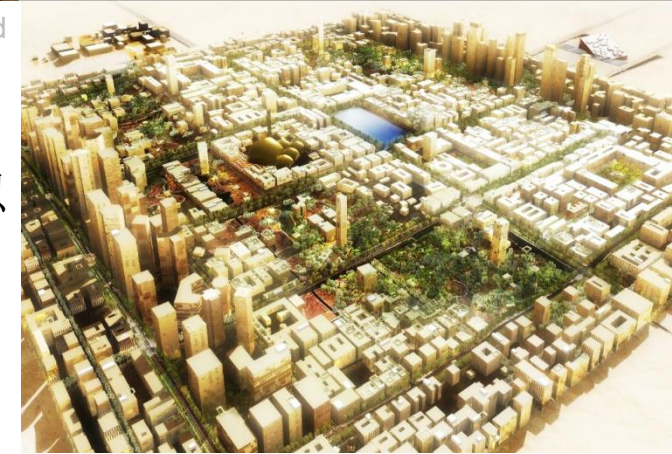


# 经济成本



In 1995 transport costs in transit-oriented Singapore were **\$10 billion less** than in car-oriented Houston (both with similar population size and wealth)

在1995年，新加坡的交通成本（以公共交通为主导）比休斯顿（以汽车为主导）要少**100亿美元**（两个城市具有相似的人口规模与经济发展程度）



Urban sprawl costs the US **\$400 billion** per year

城市扩张带来的成本超过**4000**万美元每年



Sprawling Houston spends **14% of its GDP** on transport compared with 4% in relatively compact Copenhagen, and 7% typically in Western European cities

不断扩张的休斯顿每年的交通成本占其**GDP的14%**，相比之下，哥本哈根的交通成本占**GDP的比重仅为4%**，在欧洲主要城市这个数据为**7%**



Compact, connected urban development could reduce global infrastructure requirements by more than **\$ 3 trillion** in 15 years (2015-2030)

紧凑连贯的城市布局可以在未来十五年（2015-2030）中降低对基础设施的需求，从而节省超过**3万亿美元**的建筑成本

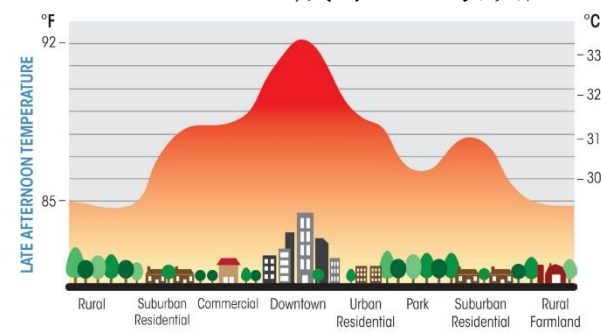




The current typology of cities and megacities in several cases generate the following:

目前对城市 and 大型城市的研究主要有以下的分类:

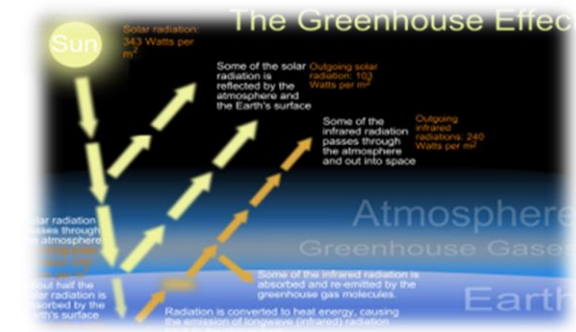
Urban heat island 城市热岛效应



Pollution 污染



Greenhouse effect 温室效应



Destruction of nature 生态破坏



Urban sprawl 城市扩张



由城市生活引起的疾病



Depression 抑郁



Waste of time 时间耗费



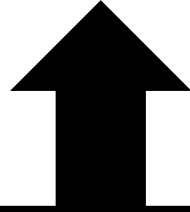
Waste of land 土地浪费

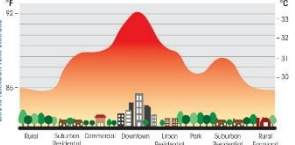

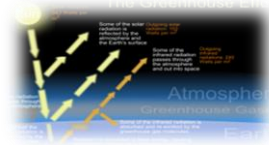









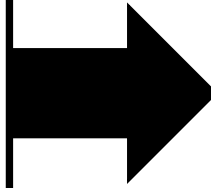
No nature contact 远离自然生态







<b>Urban heat island</b> 	<b>Pollution</b> 	<b>Greenhouse effect</b> 	<b>Destruction of nature</b> 
<b>Urban sprawl</b> 	<b>Illness</b> 	<b>Depression</b> 	
<b>Waste of time</b> 	<b>Waste of land</b> 	<b>No nature contact</b> 	





How to make cities and megacities more environmental friendly and more livable?

# 我们怎样可以将大城市变得更加环保和宜居？





# ISOBENEFIT URBANISM

## 城市的形式和大小

Urban form and size:

what shape and dimension

什么形状和规模



小型—中等大小单元的紧凑大互联

1. Compact
2. Big interconnection of Small – medium size units



## 城市结构

Urban structure:

what to put inside the city and how

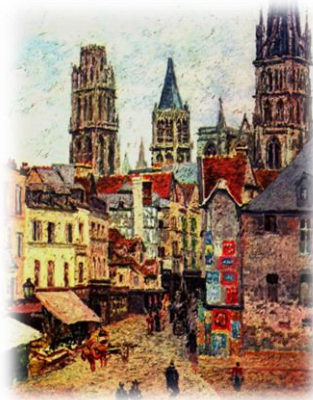
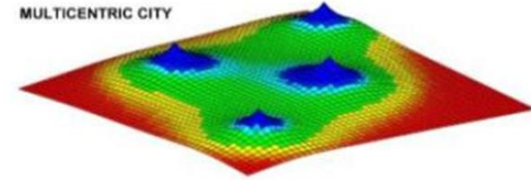
城市里应该建什么怎么建



多中心的城市

3. Multicentric city
4. Multifunctional neighborhoods  
多功能的聚居区

MULTICENTRIC CITY



Urban form + Urban structure



大自然的存在

5. Presence of nature





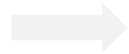
# ISOBENEFIT URBANISM

Urban form and size:  
what shape and dimension



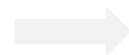
1. Compact
2. Big interconnection of Small – medium size units

Urban structure:  
what to put inside the city and how

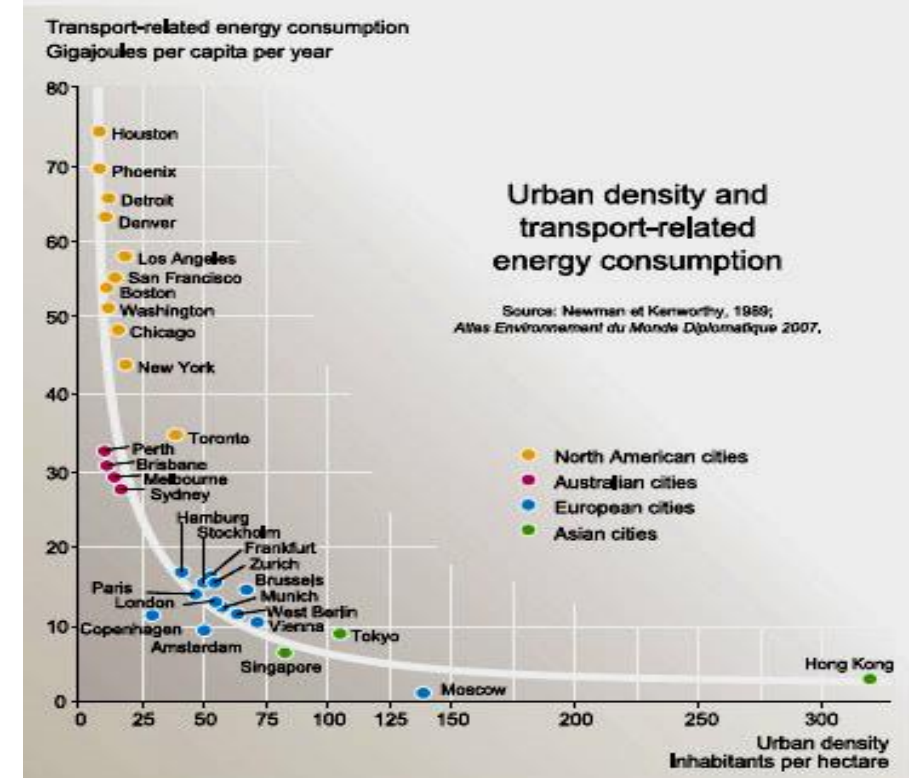


3. Multicentric city
4. Multifunctional neighborhoods

Urban form + Urban structure



5. Presence of nature



Atlanta and Barcelona have similar populations but very different carbon productivity

Atlanta



Barcelona



Population	Urban area	Transport carbon emissions	Population	Urban area	Transport carbon emissions
2.5 million	4,280 km <sup>2</sup>	7.5 tonnes CO <sub>2</sub> /person (public + private transport)	2.8 million	162 km <sup>2</sup>	0.7 tonnes CO <sub>2</sub> /person (public + private transport)



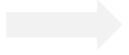
# ISOBENEFIT URBANISM

Urban form and size:  
what shape and dimension



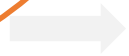
1. Compact
2. **Big** interconnection of **Small – medium size** units

Urban structure  
what to put in

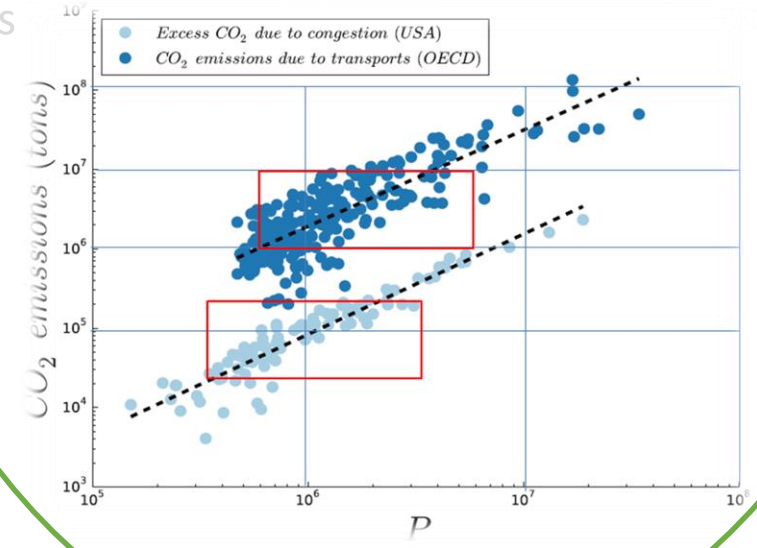
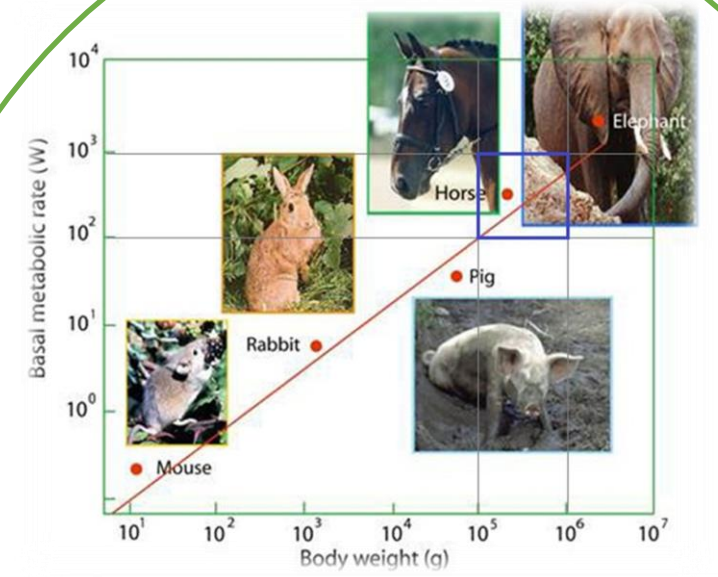


3. Multicentric city
4. Multifunctional neighborhoods

Urban form + Urban structure



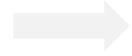
5. Presence of nature





# ISOBENEFIT URBANISM

Urban form and size:  
what shape and dimension



1. Compact
2. Big interconnection of Small – medium size dense units

Urban structure:  
what to put inside the city and how



3. Multicentric city
4. Multifunctional neighborhoods

Urban form + Urban structure

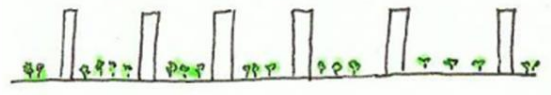


5. Pre





# ISOBENEFIT URBANISM



Ville Radieuse



Garden City

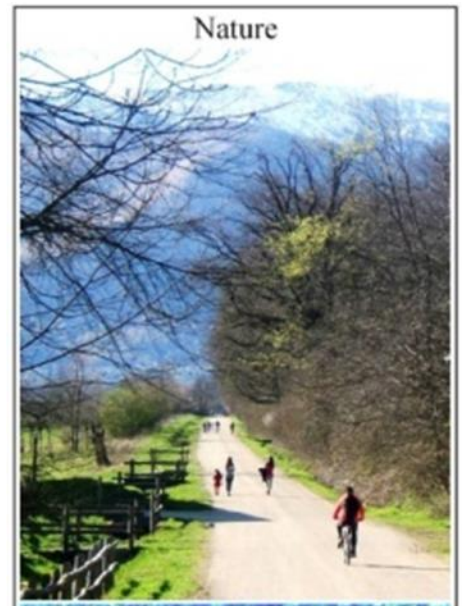


Broadacre city



Punctiform city

Nature? Urbanity?



Nature



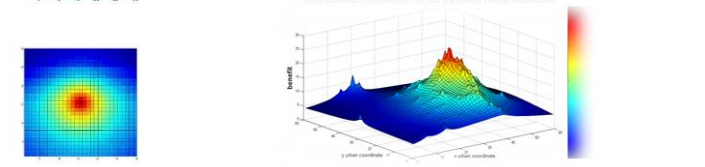
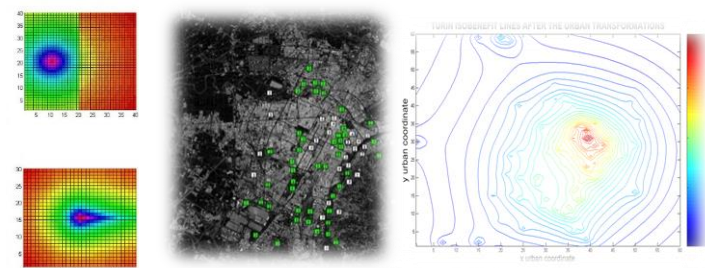
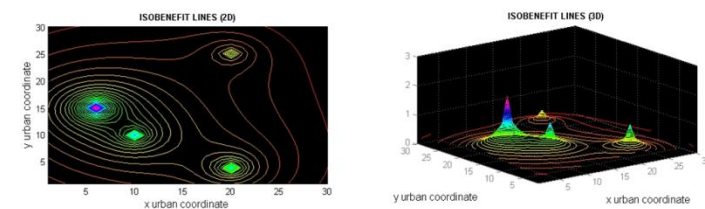
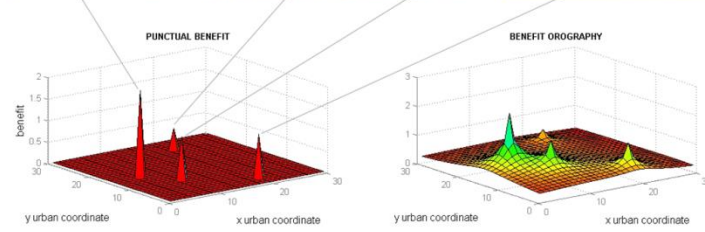
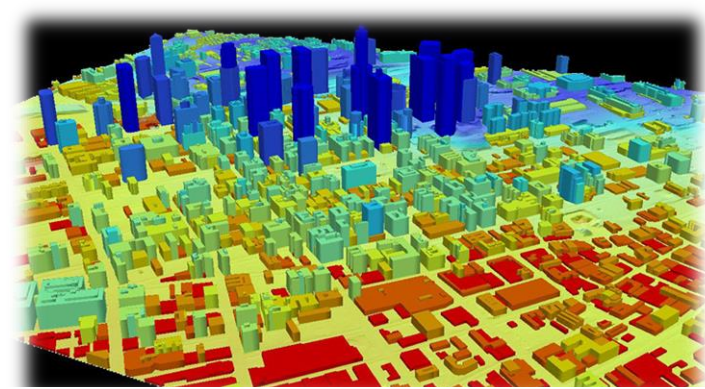
Urbanity



5. Presence of nature



# ISOBENEFIT URBANISM implementation



DNA → Optimize forms according to: *light, wind, land inclination, physical obstacles* → CONTEXT

wind

light

light

obstacles

Each citizen must reach the ordinary daily points (job, shops...) within max 30' walking (T\*); ●

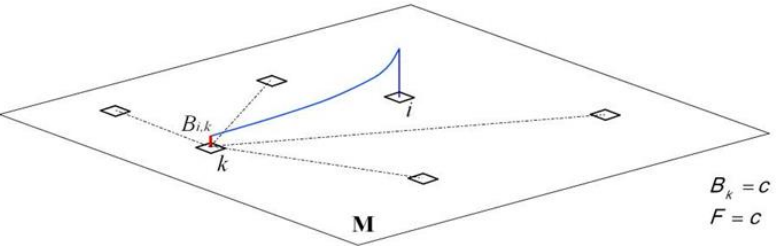
DNA → each point must be within T\* from a centrality; +

each point must be within T\* from a natural area; ●

dense urban settlement, and dense natural areas.

+ CONTEXT

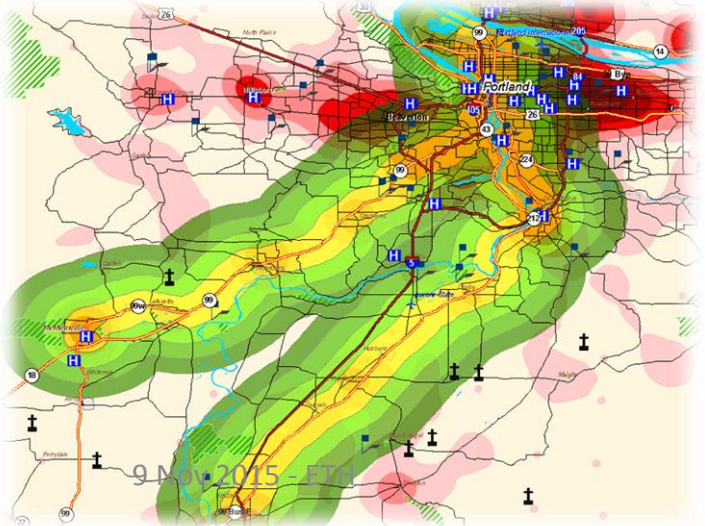
Luca D'Acci - Isobenefit Urbanism



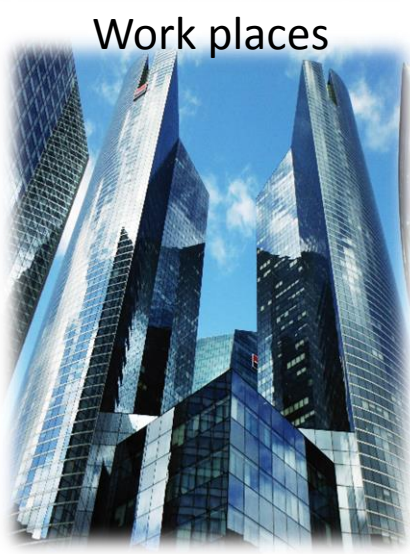
$$\forall k \in M \quad B_k = \sum_i B_{i,k} = c \geq c^* \wedge F = c \wedge T_{d,k} \leq T^*$$

$$\wedge \exists N \in \forall \notin M \quad \forall k \quad d_{N-k} \leq T^*$$

$$\wedge \exists C \in M \quad \forall k \quad d_{C-k} \leq T^* \wedge C_1 \neq C_2 \neq \dots \neq C_n \wedge \exists C | C \gg$$







Residences and centrality

Shops, services

Work places

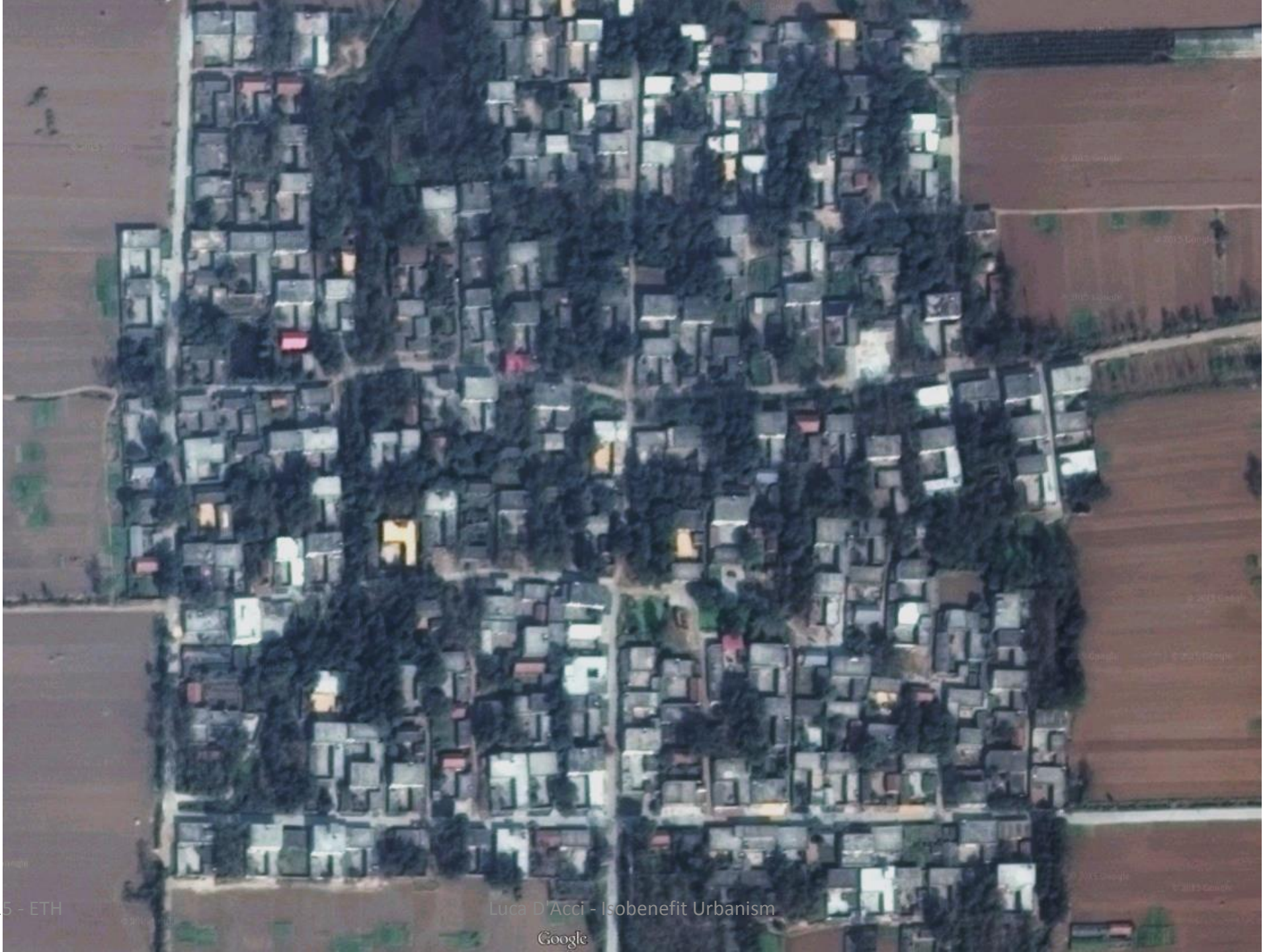
Recreational amenities

Parks and nature

9 Nov

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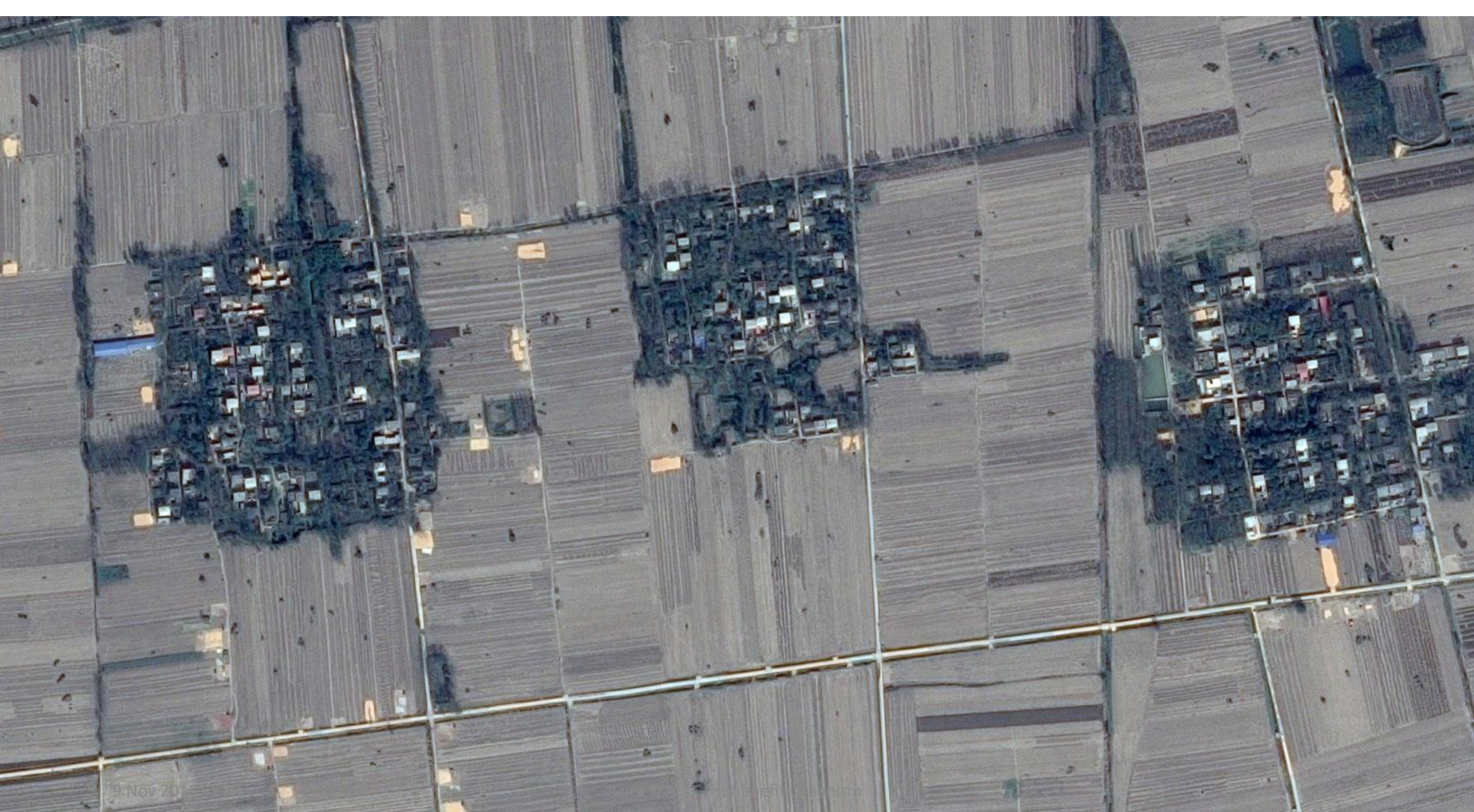


9 Nov 2015 - ETH

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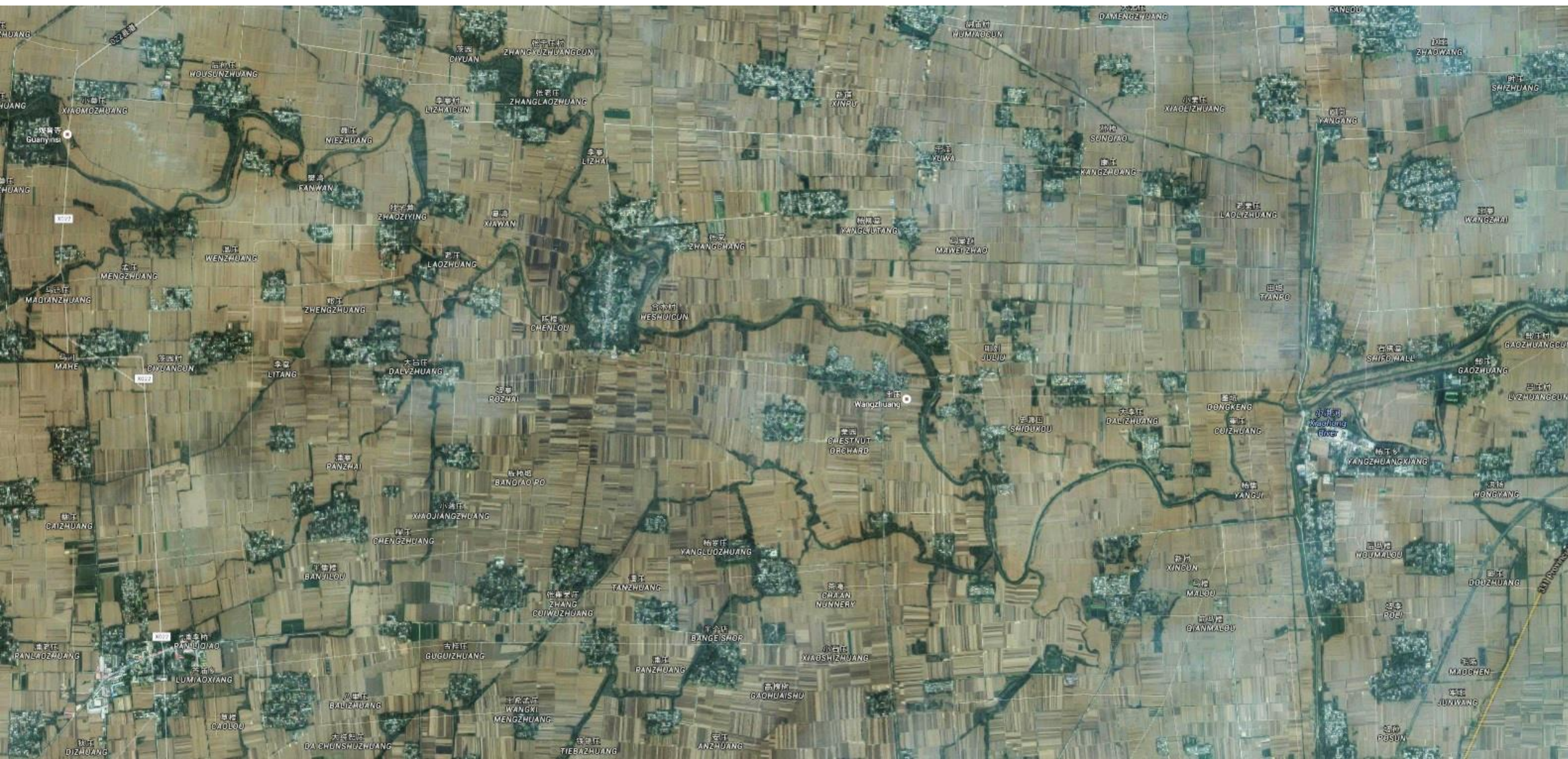




9 Nov 2017

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9 Nov 2015 14:16

Luca Di Corrali / Progettazione Urbana





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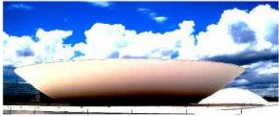
Luca N. Ricci - sobenefit.it@gmail.com



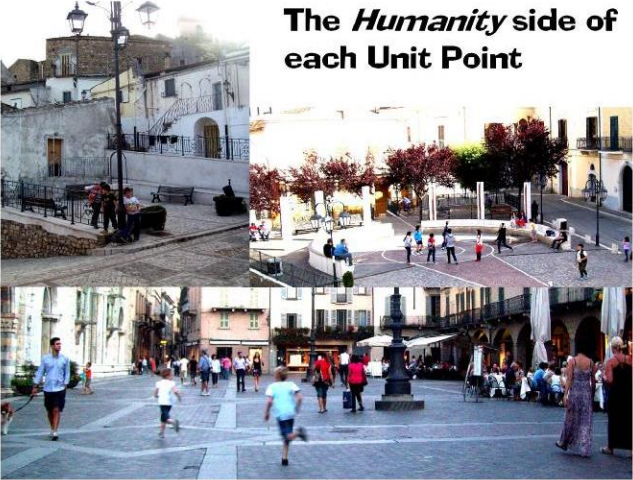
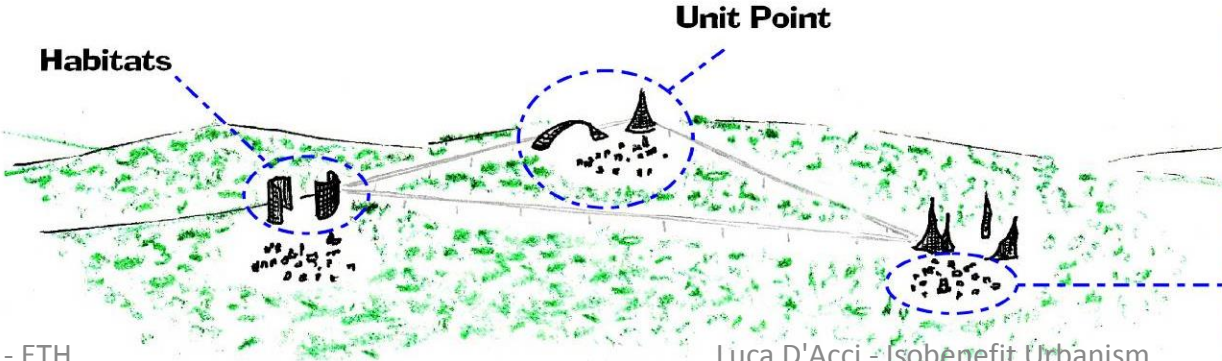
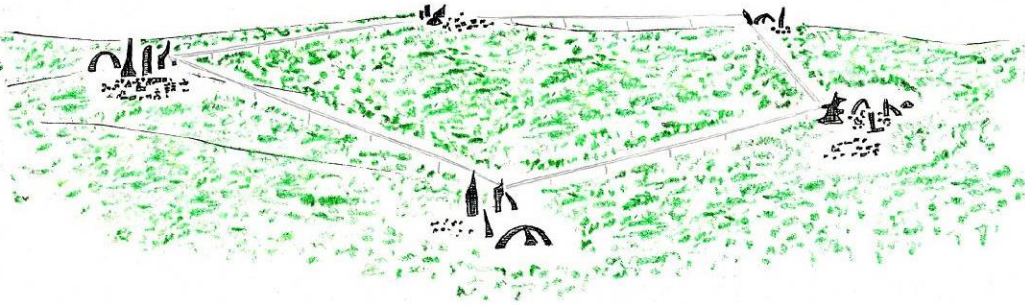
# Punctiform city



**Parks and Nature  
in which  
Punctiform Cities are;  
not vice versa**



**Habitats**



**The *Humanity* side of  
each Unit Point**



# Punctiform city

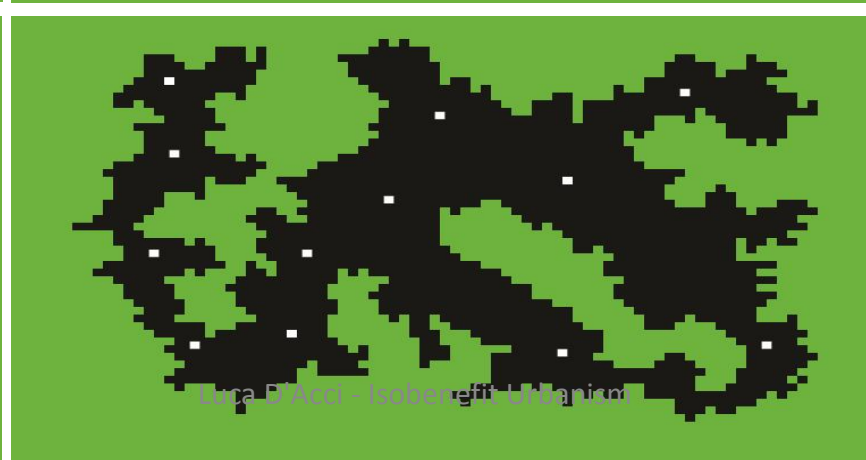
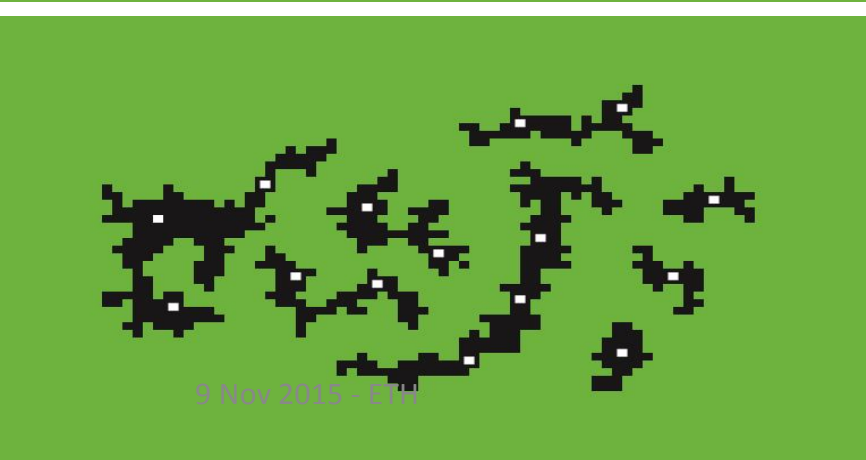
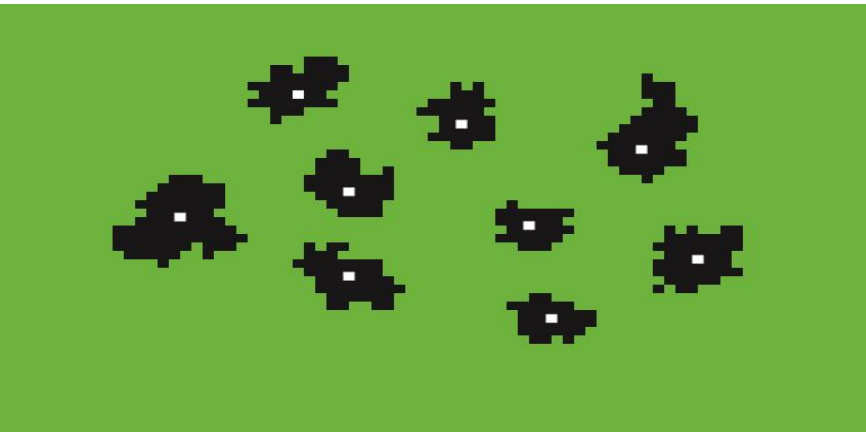




## Bottom-up + soft Top-down urban growth:

### Isobenefit Urbanism evolutions

- I. each citizen must be able to reach the ordinary daily points (shops, job, services...) within around 30 'walking ( $T^*$ );
- II. each point must be able to reach a centrality within  $T^*$ ;
- III. each point must be able to reach a natural area within  $T^*$ ;
- IV. buildings must be close to each other, in the same way natural areas (at least 1 continuous  $\text{km}^2$ ) .





**D'Acci L.** (2013). [Simulating Future Societies in Isobenefit Cities](#). *Futures*. Volume 54, pp 3-18

**D'Acci L.** (2015). [Urban DNA for cities evolution](#). <http://arxiv.org/abs/1408.2874>

**D'Acci L.** (2015). [Mathematize urbes by humanizing them. Cities as Isobenefit Landscapes: Psycho-Economical distances and Personal Isobenefit Lines](#). *Landscape and Urban Planning*, Volume 139, July 2015, Pages 63–81.

[www.urem.eu/isobenefit](http://www.urem.eu/isobenefit)

[www.urem.eu/isobenefit/lectures.html](http://www.urem.eu/isobenefit/lectures.html)