World Forum on Urban Forests Mantova 2018

Session: Poster sesión 2

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Title
Spanish Tree Failure Database (BDECA)
Base de datos española de colapso de árboles

29th November

AEPJP (Spanish Association of Public Parks and Gardens).
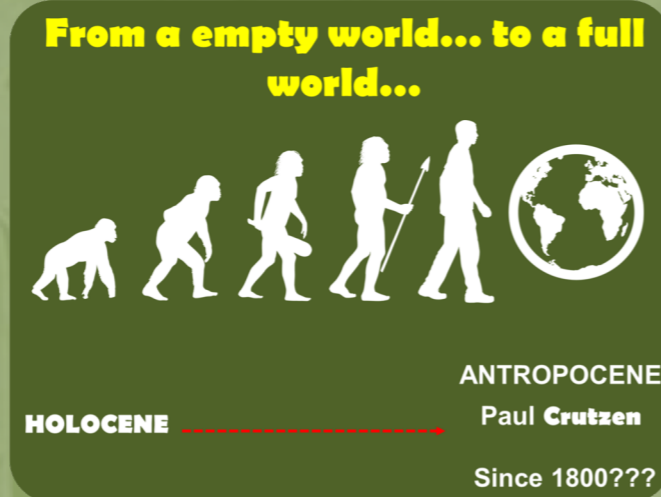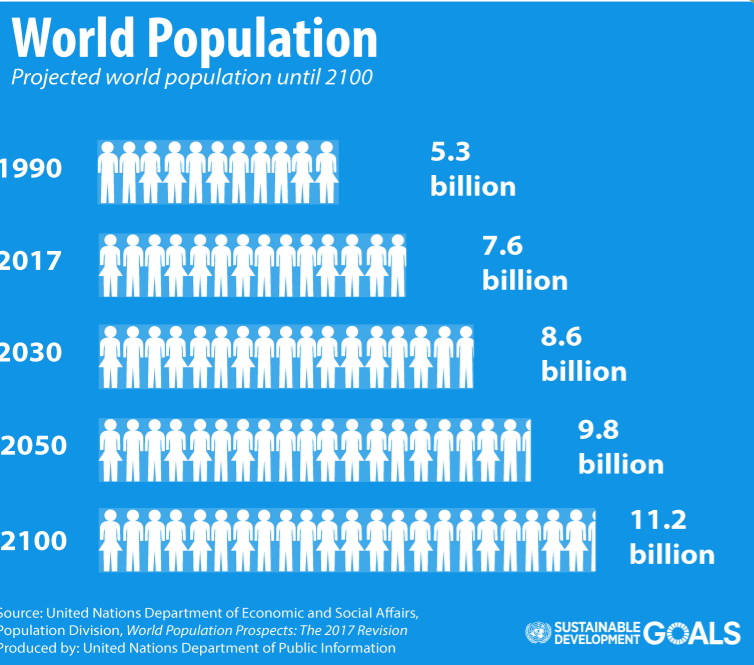www.aepjp.es

1. Context and problem

The forecast of population growth indicates that in 2050 we will be more than 9 billions in the world.
68% of the world population projected to live in urban areas by 2050, says UN (UN DESA, 2018).
In Spain more than 75% lives in cities.

The excess of urbanization that blurs the lines of natural environment, the globalization and the ageing population, together with an unhealthy and sedentary lifestyle and an inappropriate diet, generate serious problems of health, emphasizing noncommunicable diseases (**NCDs**). These diseases are the main cause of death and are classified as a worldwide epidemic (WHO, 2014; 2015).

From a empty world... to a full world...

ANTROPOCENE
Paul Crutzen
Since 1800???
HOLOCENE

Steward T.A. Pickett had coined the term *first urban century* the century in which the human has begun to be a being an *urban species* numerically.

Population >>>
Sedentary lifestyle (4 death cause, 6%) (WHO, 2009)
Unbalanced food.

WHO (2014)
NCDs Massive Urbanization
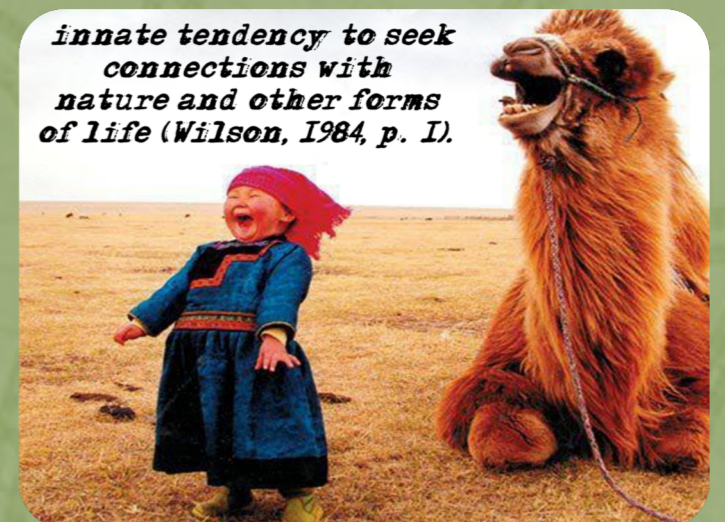Older population

Overweight, obesity... 5% Deaths / World
Prevalence of diseases (cardiovascular, diabetes, ...)
Risk factors (hipertensión, overweight, glucose, etc.)
Economical cost: 7 $ billions

60% deaths are derived from NCDs
Spain 64,7%

2. Solutions. Nature in cities

One of the solutions to minimize environmental problems and NCDs is to create healthy environments and to promote the physical activity in order to fight against sedentary lifestyle, obesity, diabetes, etc. (Ward Thomson, 2011; Calaza, 2017; Ward Thomson et al., 2014). And the nature, green infrastructure is vital in this new paradigm of urban planning.

Which direction do we want or which do we need?

innate tendency to seek connections with nature and other forms of life (Wilson, 1984, p. 1).

There are 3 theories that connect nature with health: Biophilic theory (Wilson, 1984) Art (Kaplan & Kaplan, 1989) and Ulrich Theory (1984).
Green spaces, including urban and periurban forests, elements of green infrastructure, are part of the solution (Tzoulas et al., 2007; FAO, 2016).
For this reason, we need to change the urban planning and to incorporate urban forest in their different typologies (FAO, 2016) adapted to population preferences to guarantee the attractiveness and use.
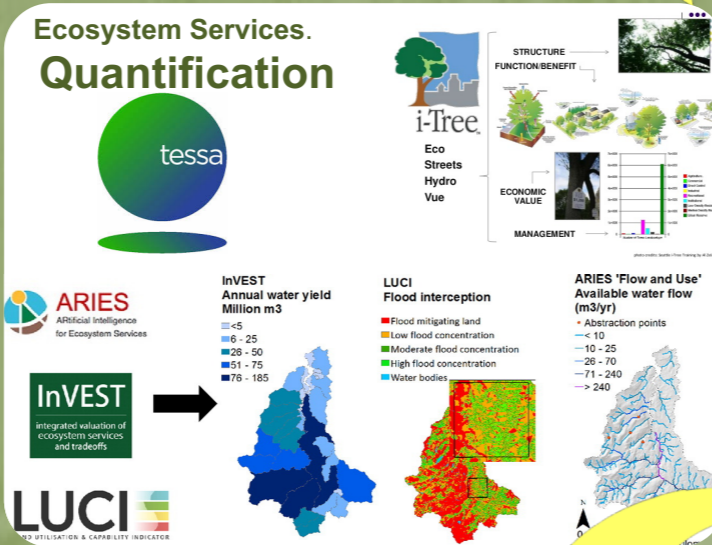
This perspective converges with Sustainable Development Goals (SGD) by ONU, specially 3. Good health and wellbeing, 11- Sustainable cities and communities, 13- Climate action and 15- Life on land, among others

3. Services and disservices of urban forests

Urban forests generate a large amount of ecosystem services: provision (wood, fruits, flowers, etc.), regulation (thermal, acoustic, etc.) and cultural (recreation, heritage, health, etc.). Currently, these benefits can be identified and calculated even in economic terms with different tools such as TESSA, INVEST, ARIES and specifically by the USDA I-Tree.
However, the mere presence of trees in urban areas also has a negative part, a cost so-called disservices (Lyttimaki and Sipilä, 2009) that are being studied in different cities such as Goteborg, Malmo and Stockholm (Delshammar, Ötsberg and Öxell, 2015). These disservices can be of different types:
a) Environmental-Ecological Diservices: CO2 + VOCs + allergies + ... pollutants (Calfapietra, 2013; Cariñanos et al, 2015.)
b) Impact on health ([CO2] + BVOCs (Sur et al., 2013) + pollen (Bartra et al., 2007) + Arthropods-allergies (Bonamonte et al., 2013), birds are disease vectors (Lohmur -Balbur 2015) + danger.
3) Social problems / hazards. crimes ...
4) Economic Costs (direct, indirect, ...).

Ecosystem Services. Quantification

Specifically in this proposal, we will focus on services and disservices related to health.

4. Disservice: Hazard tree

Tree structural collapses are perhaps the most important disservice and the most shcking in the media, especially when they harm people. As Dr. Kenney (2010) says:

the objectives of tree management are "**To optimize the leaf area of the entire urban forest by establishing and maintaining a canopy of genetically appropriate (adapted & diverse) trees and shrubs with minimum risk to the public and in a cost-effective manner**".

Big trees provide big ecosystem services, but probably also more potential hazard...

To optimize urban forest ecosystem services, we need to improve the hazard tree managament.
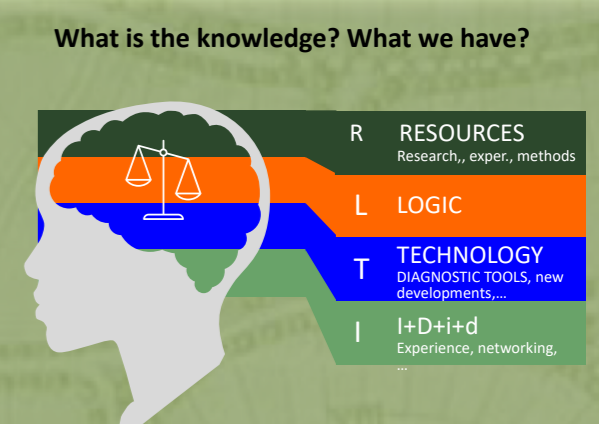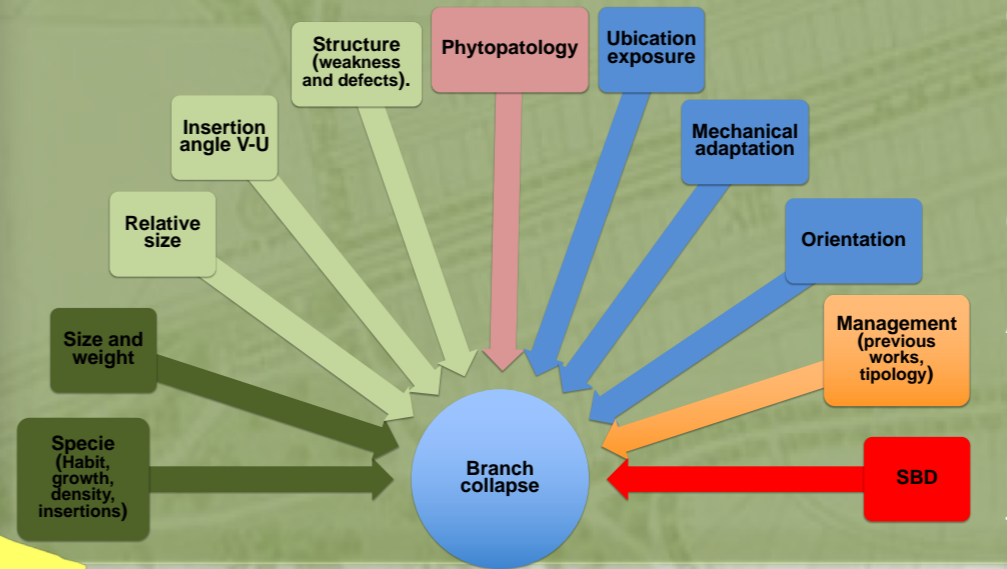
Risk assessment is complicated in so far as it is not possible to guarantee a level of risk 0, given the limitations in knowledge and the enormous casuistry that can occur.

An example that resumes the large number of variables that influences the fracture of branches is showed in the figure on the left.

What is the knowledge? What we have?

R RESOURCES Research, exper., methods
L LOGIC
T TECHNOLOGY (DIAGNOSTIC TOOLS, new developments...)
I I+D+i+d Experience, networking.

5. Knowledge, methodologies and tools

In recent years, numerous theories, methods, diagnostic tools and research have been developed to improve risk assessment but it is still necessary to continue to build an universal but also local field of knowledge. For example, the behavior of the species is different depending on the biogeographic context, and the calculation equations of some methods can not be extarpolated in a generic way.
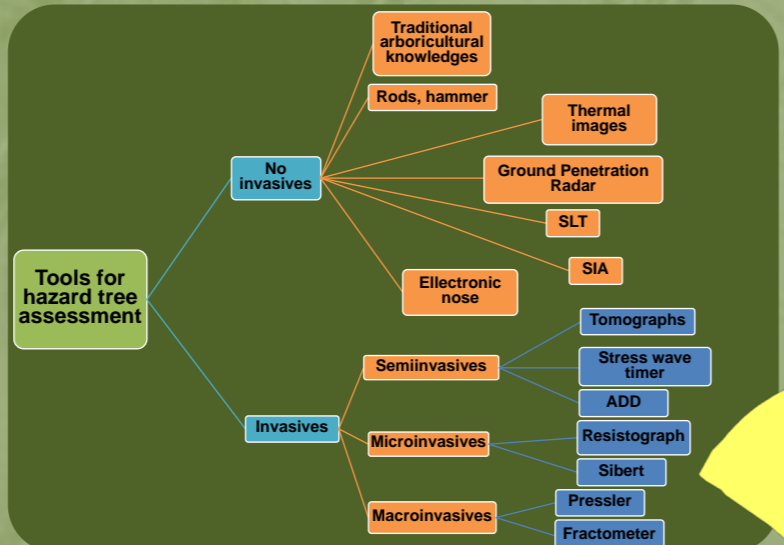
By other way, the risk assessment tools require, in many cases, to adapt them to local conditions and even some can not be applied directly due to the absence of data. A good example is the use of the Stuttgart catalog of mechanical parameters. It is valid for Central European environments but hardly applicable to the south of Spain

BDECA
BASE DE DATOS ESPAÑOLA DE COLAPSO DE ÁRBOLES

Why?
✓ To Improve the hazard tree local knowledge.
✓ New Spp behaviour (CC).
✓ Different contexts.
✓ Moral and profesional obligation: Public Health and security

For what?
More accurate prognosis.
Walk towards rational, contemporary and complete management.
Make biofilic cities.
Collapse patterns by species.

Of all and from all!
Share.
Global improvement
Management and selection.
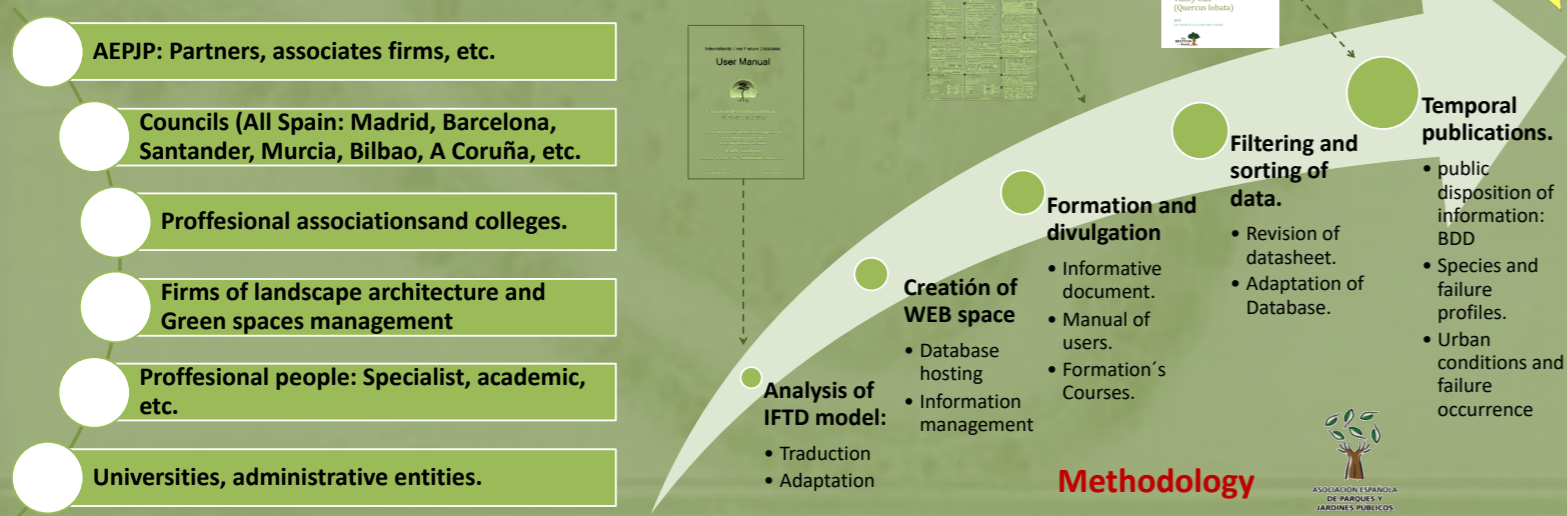Integration and planning of species.
Revision and identification protocols.

The **Spanish Database of Tree Collapse (BDECA)** emerges as a proposal to create a platform of knowledge similar to the International Tree Fault Database (ITFD).
It is intended, through the collaboration of arboriculture professionals, town halls, companies and other collaborators, to create a source of data on real experiences of failures of urban trees in order to improve knowledge of the species, cultivars and varieties used in Spain.
The purpose is to be able to use it for a better selection based on parameters of situation, exposure, typology of collapses, soil type, susceptibility to biomechanical defects, etc. and also in its integral management.
Some of the variables that are incorporated into the BDECA are reflected in the figure on the left.

6. Goals and stakeholders.

BDECA was born as an open database for the general use throughout Spain. When we obtain a minimum number of data per species (for statistical purposes), we will develop reports of failure profiles and mechanical behavior of the species.

- AEPJP: Partners, associates firms, etc.
- Councils (All Spain: Madrid, Barcelona, Santander, Murcia, Bilbao, A Coruña, etc.
- Profesional associationsand colleges.
- Firms of landscape architecture and Green spaces management
- Profesional people: Specialist, academic, etc.
- Universities, administrative entities.

Methodology

In order to guarantee reliable data and with homogeneous criteria, the data must be provided by registered professionals. For this, free basic training courses will be taught in different Spanish regions.
The trained professionals will have an access code and may include their information directly. City councils such as Madrid have already included it among their contractual obligations.
Periodically, reports will be published and it is intended to maintain a smooth collaboration and communication with similar projects in other countries.

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