Workshop: Mediterranean Climate Issues

26/11/19

The round-table discussion had the aim to give Mediterranean cities the possibility to discuss on the common problems they are having due to the climate features of their cities, sharing ideas and solutions to overcome them. In order to prepare the discussion, it was previously asked to the Mediterranean cities to prepare some points to be deepened during the workshop and once all the contributions were received, they were sent to some consortium experts to collect more technical inputs to help the physical discussion.

Participants:

- RINA (Sara Botto)
- Castellòn (Luis Gargori Reverter)
- Başakşehir (Ömer Onur)
- Cannes (Benoît Agassant)
- LAND (Andrea Balestrini)

Starting from the cities and experts (Andrea Balestrini from LAND) contributions the discussion was developed summarizing the main problems of the Mediterranean cities:

- **Violent storm days and floods**
  - Water bombs not easy predictable
  - Flooding problems near the river and coastal areas
  - Risks of possible damage to people and things
- **Rain permeability – rainwater recycle/usage**
  - Too sealed and waterproofed paved surfaces
  - Runoff and pollution problems of aquifers and sewers
  - Difficulty of use and/or recycle rainwater things

Then the discussion focus on the following topics:

1) **Water management in the most critical areas (e.g. polluted zones/aquifers) – lack of spaces in the cities where to implement NBS**

CASTELLÓN: There is a big problem with the area near the coast, a wetlands area. In the past years this area was used for rice collection, but then it was abusively transformed in a residential area and now, as the water from the aquifers is being pumped out, the aquifers are becoming more and more salinized and polluted.

In order to solve this issue Castellòn is involved in the Urban Innovative Action, a pilot project that has the aim to provide clean water to the residents of the area, developing a storage water system where to redirect waste water and to treat the polluted water. The project financing is now facing problems due to some administrative issues.

BAŞAKŞEHIR: It is not easy to intervene in the empty lands in Başakşehir, because besides being partly public and private they are very expensive. There is a water management plan concerning the storm water collection and filtering through water tanks underground.

CANNES: In Cannes the majority of the lands are already built, so most of the construction works concern renovation (e.g. deviating river course). In order to regulate the new constructions there is a plan that specify where you can/cannot build. The majority of the empty lands can't be used because they have to be used for farming,

2) **Citizens awareness about the risks related to violent storm and floods phenomena**

CASTELLÓN: There are specific educational school programmes, because it is important to start raise the awareness of the future generations from the beginning.

CANNES: There are educational programmes about risks and a special desk for the citizens has been established. The citizens can use this desk to ask help in solving specific issues related in particular to the implications of climatic events.

BAŞAKŞEHIR: They have created a programme for the citizens concerning the waste management: the correct application of waste separation rules allows to collect some points that can be used as vouchers in shops.

3) **Permeable/draining pavements implementation**

CANNES: There are concerns in the usage of draining pavements as a solution to prevent runoff and floods issues, because it seems that they could be quite useless in case of violent rainstorms.

LAND: The draining pavements are also effective in case of violent storm water, but they have to be carefully designed using modular systems under the soil. It is necessary to stabilize the soil first with bioengineering (e.g. i.idro DRAIN, an innovative draining concrete that prevent runoff).

4) **Green roofs implementation**

CANNES: The green roofs are not easy to be implemented in case of building renovations because of their expensive costs also related to the irrigation system (in Cannes there are both dry and heavy rains periods, so what kind of vegetation can be used?).

LAND: In Southern Europe no one build green roofs without irrigation, but they use species that could adapt to Mediterranean climate and that they don't require much water (e.g. sedum). The cactuses are not very used because they don't have a very high evapotranspiration/drainage effect. An interesting solution are the draining roofs that collect storm water and redirect it to the ground.

LAND specific answers to the questions collected from the cities:

CASTELLÓN:

a) In Castellón we have an average rainfall of about 40 days a year. The problem is that 25 of that days are storm days, and we have lots of flooding problems.

   These harsh climate conditions are common to other Southern European regions. Open spaces are supposed on one hand to be resilient to powerful rain flushes, on the other they ideally could collect and later reuse/release rainwater in detention basins or underground storage systems.

b) We have wetlands near the coast, and the houses in this zone has been increased in the last years. Every storm day is a serious problem in this part of the city.

   Wetlands not only provide biodiversity, they also work as retention areas. Within housing areas bioswales and geocellular tanks could improve the drainage of such extreme events.

c) More than 50 % of our water resources comes from aquifers. The bad management of aquifers is driving us to a delicate situation because their low level has been caused the entry of seawater and has been salinized.
   Infiltration ponds, draining surfaces and bioswales are key solutions to help recharging the aquifer.

d) Another of the main problems of aquifers is pollution caused by agriculture, either by nitrates or pesticides.

   Sustainable agriculture should be the overall strategy to tackle this challenge: nevertheless a diffused system of linear wetlands could improve water quality before their outlet into the aquifer.

References

Lochiel Park, Adelaide
https://renewalsa.sa.gov.au/projects/lochiel-park/
Royal Park Wetland, Melbourne
http://landezine.com/index.php/2011/04/royal-park-wetland-by-rush-wright-landscape-architecture/
Laroque Des Alberes Cemetery
http://landezine.com/index.php/2011/08/landscape-architecture-cemetery/

GENOA:

a) The high level of waterproofing in the urban areas increases the problem of the runoff on the paved surfaces, stressing the sewerage network that is old and mixed in most of its parts. In these conditions recycling the rainwater entered in the sewers becomes very difficult.

   In these terms rainwater recycling from sewage is not recommendable: the nature-based approach should prevent stress-conditions for the water network by reducing stormwater runoff with draining surfaces, green areas and detention areas.

b) The torrent floods formation is alarmingly quick, due to the "water bombs" problem and to the high slope of the hillside just behind the city

   Slope afforestation can reduce catastrophic effects.

c) The unpredictability of the weather phenomena that always strike the city in different areas

   Small scale draining green spots should be spread all around the city and not only in certain areas.

d) The difficult management of the public services during the days with weather warnings

e) The need to mitigate the risks of possible damage to people and things

   Climate-resilient open spaces should provide safe-zones for population by deploying context-specific solutions also in relation to the foreseen activities: i.e. playgrounds could serve as retention areas if well integrated into risk alerting measures.

f) The complexity of all the legislative and planning tools that make difficult to implement the urban regeneration interventions

   Many cities are adopting drainage-oriented regulations to guide projects with a standardized framework: i.e. RIE regulations in Bolzano (Sudtirol)

References:

Riqualificazione Piazza Facchetti, Cesano Maderno
http://www.brianzacque.it/cantiere.html#/!575832ecc58b3d03009561ad
Enghaveparken, Copenhagen
https://www.tredjenatur.dk/en/portfolio/enghaveparken-now/
Draining parking, Bardolino
http://www.harpogroup.it/sites/default/files/harpogroup.it/gallery/gallery/Harpo%20-%20verdepensile%20-%20Parcheggio%20localit%C3%A0%20Bardolino.jpg
Nature leisure area, Barcelona
http://landezine.com/index.php/2011/05/nature-leisure-area-in-montserrat-by-emf-landscape-architecture/
Public space, Torre Pacheco
http://landezine.com/index.php/2011/01/urban-spaces-and-library-park-in-torre-pacheco-by-martin-lejarraga-architecture/

CANNES:

a) How to implement NBS with our particular weather (long dry period in summer and violent rainfall episodes)? Could we take into account in the NBS handbook the Mediterranean specificity (i.e. pointing which NBS are appropriate or not to Mediterranean climate, or possibly how to adapt some of the NBS to Mediterranean climate)?

Mediterranean cities require to adapt NBS to their specific climate but also to their dense urban fabric, where wide spaces are seldom available and different functions tend to overlap. Runoff and drainage dynamics are different to Northern Europe, moreover vegetation pattern should include drought-prone species.

b) How to build green roofs (or green walls) resilient to dry period (without any water supply) and heavy rainfalls?

Vegetation selection is crucial: many native species adapted to such extreme conditions and should be taken into account. A major role is played by maintenance: i.e. intensive meadows are rot recommendable; natural low-maintenance meadows instead could provide more biodiversity and resist longer to drought periods in such climates.

On the other hand also drainage approach is crucial: green roofs have been initially conceived for Central and Northern Europe, where rainfall and evapotranspiration curves do not overlap, and irrigation is not necessary. In southern Europe to highest summer temperatures correspond driest months, so irrigation is mandatory to make plants survive. Nevertheless its amount can be reduced by adequate plant selections and drainage systems: basically in Norther Europe green roofs can work as storage facilities, in Southern Europe water need to be removed as soon as possible to avoid infiltrations into indoor spaces or overcapacity of drainage devices. In such regions their benefits are mainly thermic insulation (in Bari cooling has been measured as performing as 21/27% by Stefanizzi-Resta in 2015), reducing local air temperature (-2/5 °C according to Peng, Jim 2013), reducing rainwater discharge by evapotranspiration and absorption (-60/80% according to CNR-IRSA) and increasing local biodiversity.

c) Are permeable pavements efficient in case of heavy rainfalls? How to manage permeability while the pervious soils (even natural soils) are made sealed under heavy rainfall?

Permeable pavements are efficient if the lower soil layer is draining. Otherwise they require a proper draining layer between surface and soil to redirect water to collecting network; in this case they are deployed to delate the runoff inlet into drainage systems.

d) How to implement NBS (which promote water in the center of the city) without promoting tiger mosquitoes (Aedes albopictus)?

Mosquitos could become a problem if water remains too still and if their natural predator are not included into local ecosystems. The design should therefore prevent these effects by introducing water circulation and providing the adequate vegetation to host other animals (i.e. frogs, birds and other insects).

References:

Parque Rio, Madrid
http://landezine.com/index.php/2011/04/madrid-rio-by-west8-urban-design-landscape-architecture/
Piazza Europa, Catania
http://www.harpogroup.it/sites/default/files/harpogroup.it/media-areatecnica/allegati/Piazza%20Europa_Catania_0.pdf
Passeig De St Joan Boulevard, Barcelona
http://landezine.com/index.php/2012/07/passeig-de-st-joan-boulevard-by-lola-domenech/
Park, Garden and Green roof, Badajoz
http://landezine.com/index.php/2015/03/park-garden-and-green-roof-of-caja-badajoz-by-cristina-jorge-cjcpaisaje/

BAŞAKŞEHIR:

a) As a continously growing city it is a challenge to maintain and/or improve the balance of Green & Blue in the city. It requires continous planning and implementation and one of the main challenges is to take over land from private owners and from other Utility Institutions that either belong to the metropolitan city or to the government. On this point there is a need for a well coordinated relationship management structure in the Municipality to tackle these issues together with handling the environment, the stakeholders, the finances and the monitoring.

b) Educating public and creating a Environment Culture is also a challenging issue which is needed for leaving a better future for the coming generations. Not only by teaching but also by showing the applications and the diversity is important

c) Governance seems to be another focus point so that sustainable policies, processes and mechanisms are established in order to ensure all political parties that rule the city continue their focus on these issues out of all the other issues they need to tackle

d) Although is not a Mediteranen city Turkey has a long mediteranean coast line. I think one of the most important issues for Mediteranean countries are forest / green fires that seriously affect the climate. How to preventing and tackle these wild fires?