Climate Change Urban Resilience Scenarios in Hermosillo

WORKSHOP REPORT | NOVEMBER 6, 2017

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Urban Resilience to Extremes Sustainability Research Network

www.URExSRN.net

Workshop Summary

Cities need to anticipate and adapt their infrastructure decision in view of the climate changes that are causing a new global reality. With this purpose, the first workshop on future visions for sustainability and resilience to climate change and extreme events was held in Hermosillo on November 6, 2017. This workshop is part of the initiatives promoted by researchers and practitioners from 10 cities in the United States and Latin America that participate in the Urban Resilience to Extreme Events Sustainability Research Network (UREx SRN). The UREx SRN is a project funded by the National Science Foundation (NSF) that seeks to support planning and urban development by generating future scenarios through a participatory and anticipatory process. This exercise serves as a basis for promoting resilience to extreme climate events, such as urban flooding and extreme heat events.

During the workshop, approximately 60 practitioners, managers, decisionmakers, civic and community organization leaders, designers and professors from different institutions gathered at Hotel Araiza to share and develop adaptive scenarios to extreme events and to to build transforming scenarios for visions of the future that seek to radically change the city's infrastructure. Through various activities, the participants defined goals and strategies for each scenario, specifying when and where they would occur (see pages 5-8). At the end of the workshop, the participants presented their visions for Hermosillo 2080 using various methods, including narratives such as stories of imaginary characters living in Hermosillo 2080, accompanied by illustrations.

About the Urban Resilience to Extremes Sustainability Research Network (UREx SRN)

The goal of the UREx SRN project is to improve the resilience of urban social, ecological and technological systems in the face of the growing challenges that climate change poses to cities. The UREx SRN network includes ten cities affected by floods, heat waves and/or droughts. The network has a wide range of researchers from universities in the North and South, as well as municipal practitioners, members of the civil society, and residents.

Through the co-development of scenarios in participatory workshops - such as those described in this document – we research possible transition paths to help transform cities for a more sustainable future.

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UREx SRN CITIES:

- Baltimore, Maryland
- Hermosillo, México
- Mexico City, México
- Miami, Florida
- New York, New York
- Phoenix, Arizona
- Portland, Oregon
- San Juan, Puerto Rico
- Syracuse, New York
- Valdivia, Chile

Scenario Development Process

Workshop participants began by establishing and deliberating the main goals for a 2080 Hermosillo that is more just, equitable, sustainability, and resilient. Several social, ecological and technological strategies were presented and envisioned that have been implemented in adaptation and resilience interventions in other cities around the world.

Additionally, the UREx SRN team presented a vision of the city's infrastructure as a social, ecological and technological system (SETS) to help frame in an integrated manner the different dimensions of the city. Several activities were designed to facilitate scenario development based on the following questions:

1

PAST, PRESENT, AND FUTURE

What does a sustainable and resilient Hermosillo mean in the year 2080?

2

OBJECTIVES AND CHALLENGES

What SETS strategies are necessary to achieve the objectives of the future scenario?

3

STRATEGIES AND GOALS

What precise goals are necessary to achieve the SETS strategies?

4

SPECIFICITY

When, and in what sequence, do the strategies need to occur to achieve the proposed goals? Where should the strategies occur, and for the benefit of whom?

5

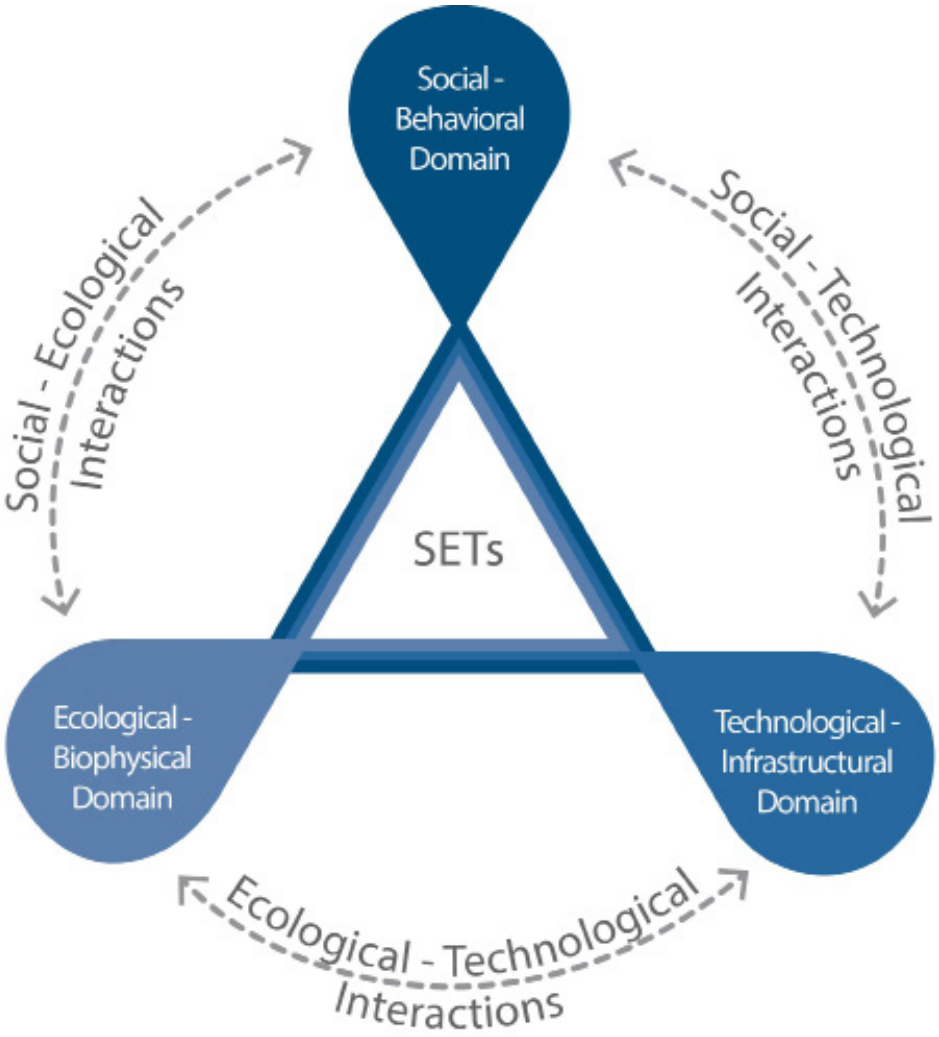
NARRATIVES

What would the city of Hermosillo be like for a person living in the year 2080?

Social-Ecological-Technological Systems (SETS)

Many of the problems we face today, such as climate change, social inequality, or environmental health, cannot be solved by traditional planning approaches. These are complex problems and with high levels of uncertainty that require the integration of different perspectives, experiences, and knowledge. One of the problems that challenges the planning and governance of cities like Phoenix is how to create resilience to extreme external forces such as those posed by climate change that endangers lives, communities, and infrastructure in the urban system. When they are resilient, cities can persist, grow, and even transform, maintaining their functions and identity. The thinking of social-ecological-technological systems (SETS) integrates these three dimensions from a perspective of complex systems and is essential to promote resilience in cities and facilitate their transformation towards more sustainable futures.

Cities are complex SETS, and so too are parts of cities such as neighborhoods, parks, and infrastructure. The social dimension includes both decision makers and the people affected by them. The ecological dimension includes elements of a non-human nature that are part of the fabric of cities, for example, trees, soils, and water. The technological dimension includes the built components of cities, for example, the road system, buildings, or public transport networks. But perhaps the most important feature of the SETS approach is that it is a systems approach. This means that the social, ecological, and technological elements are not considered separately, but rather as a whole and paying special attention to the relationships and interactions between the three dimensions.



Adaptive Scenarios

The workshop for generating scenarios was focused on six tables with prioritized topics that were defined by a survey filled out by the same workshop participants. The results of each theme are presented here:

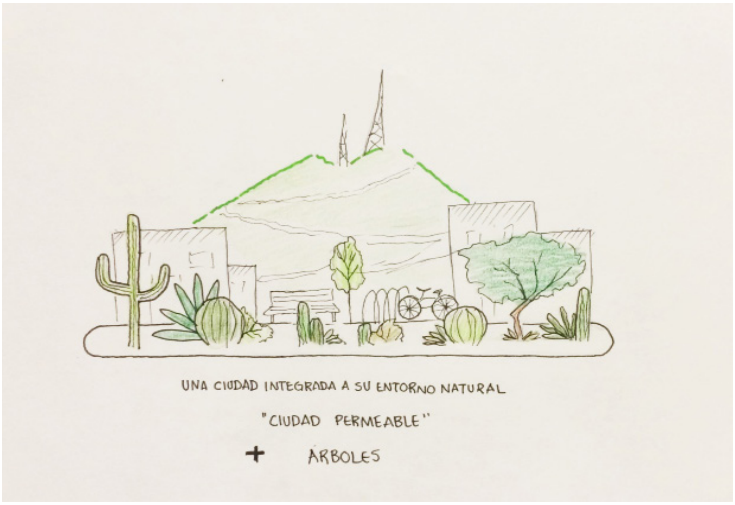
Smart Urban Development

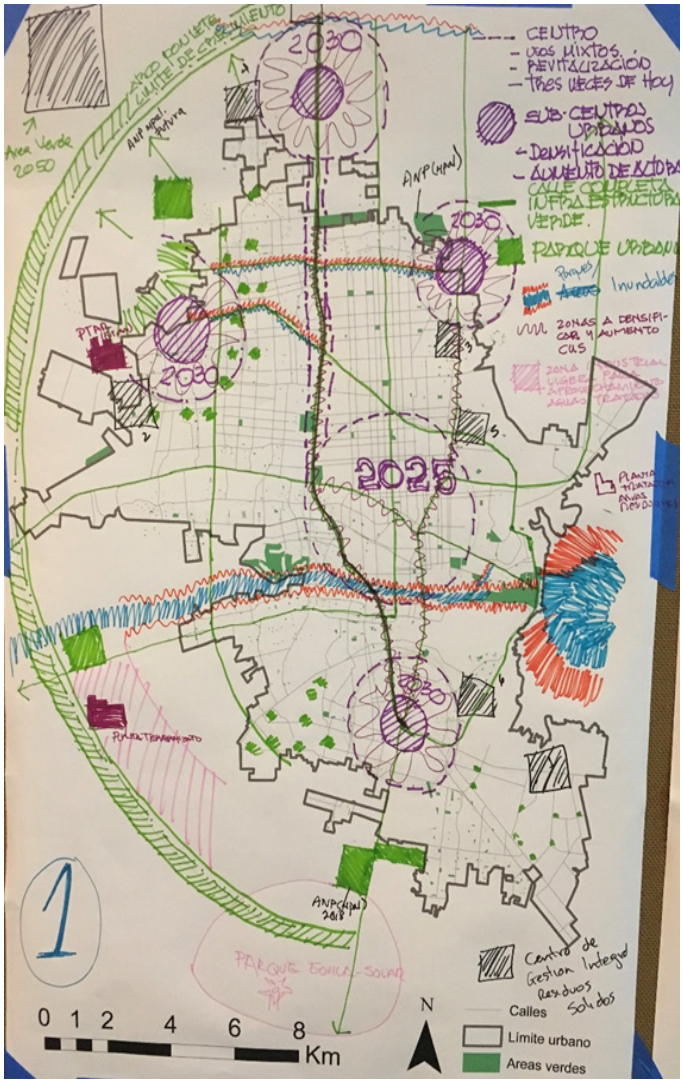
Objectives and Challenges:

New urban development plan including risk reduction in the urban area. Application of urban law promoting civil awareness and technology for natural resources conservation. Integration between the city and natural areas and establishment of city limits. Compact polycentric and diverse population.

Strategy Examples:

■ 1) Update of construction regulations, ■ 2) urban attorney creation, ■ 3) Environmental incentive program, ■ 4) citizen awareness permanent campaign, ■ 5) urban reserves acquisition, ■ 6) legal establishment of city limits congruent to freeways, ■ 7) use of water treated in industries, ■ 8) reduction of a deficit in green areas, ■ 9) increase of protected natural areas, ■ 10) implementation of urban agriculture.





Adaptive Scenarios

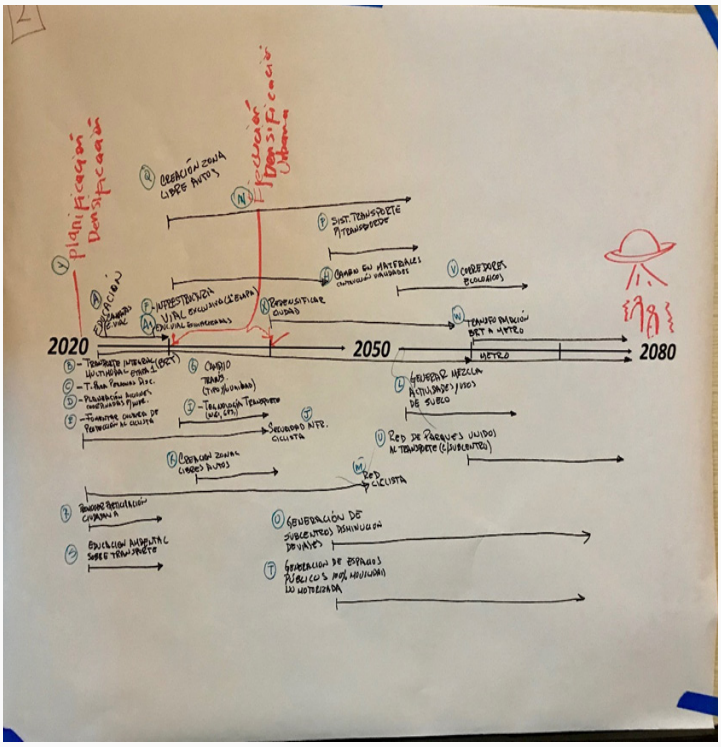
Mobility & Transportation

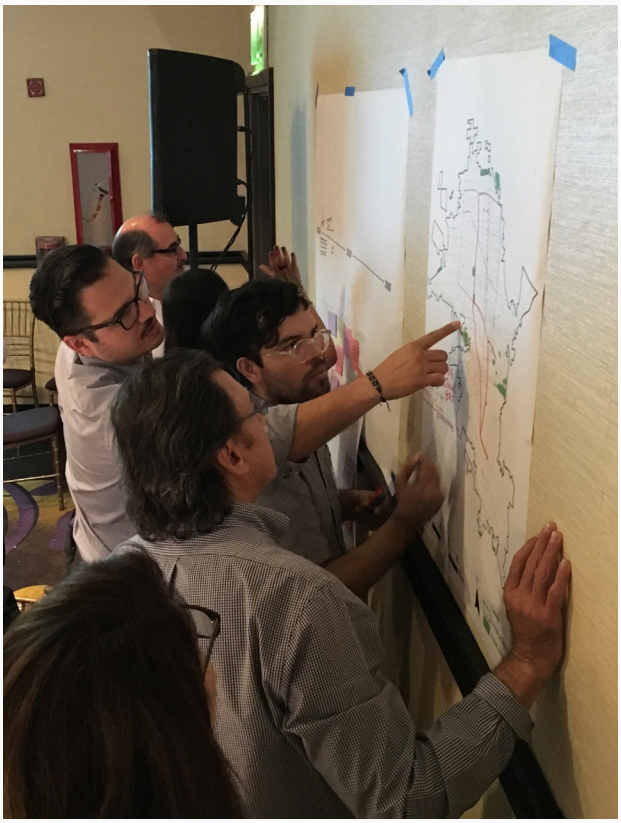
Objectives and Challenges:

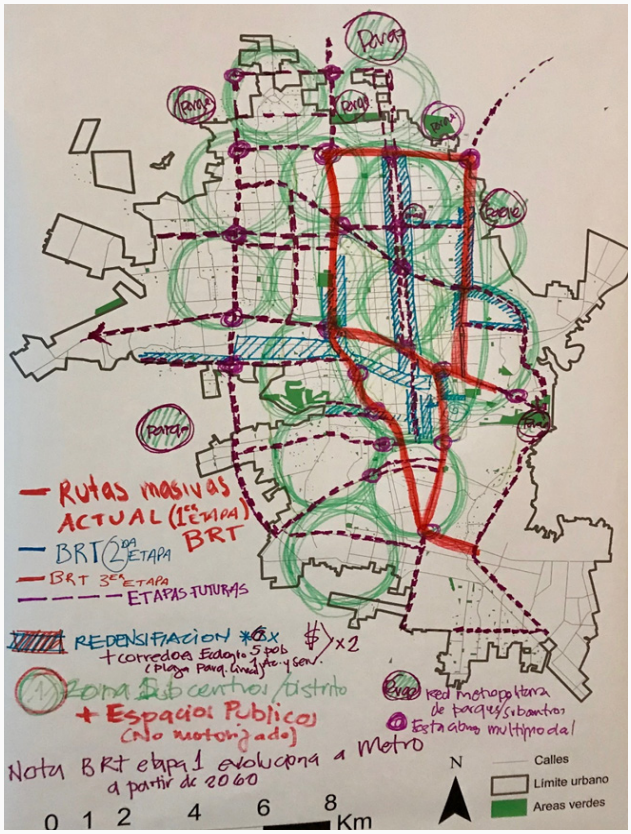
Redesign of the urban transportation system. Zero emissions mobility and zero accidents. Reliable and efficient and transportation system using information technologies. Public spaces at a pedestrian scale, no motorized mobility. Develop education programs.

Strategy Examples:

■ 1) Public transportation for the disabled, ■ 2) integral and multimodal system that allows line transfers with the same ticket, ■ 3) construction and improvement of lines to enhance access and evacuation routes, ■ 4) education programs for accident prevention, ■ 5) exclusive infrastructure for the public transportation system, ■ 6) implementation of technology, ■ 7) mix of land use in city sectors, ■ 8) city densification.





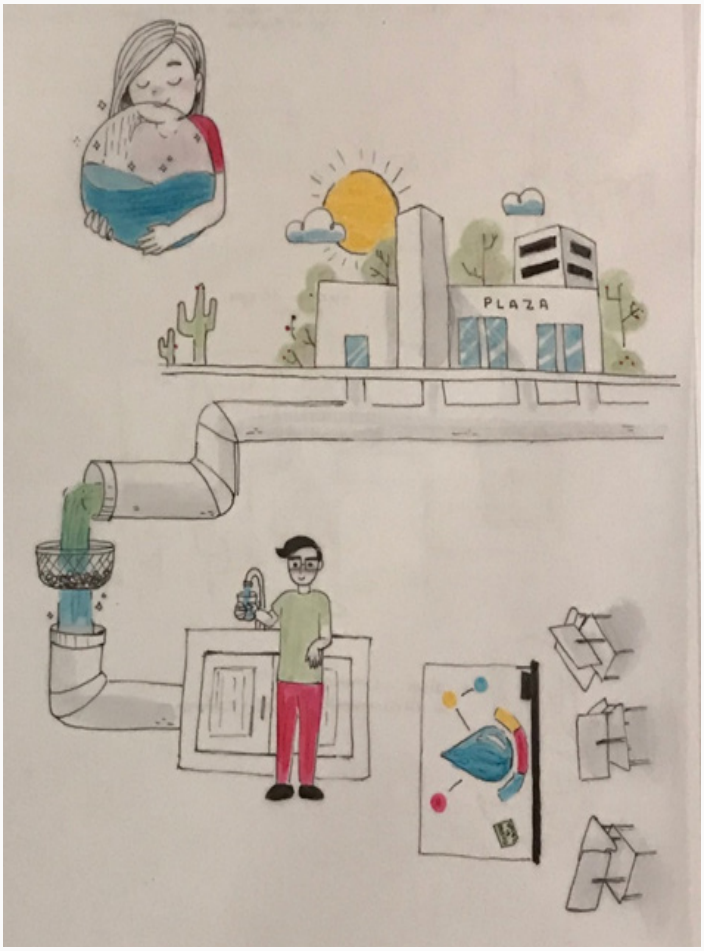


Adaptive Scenarios

Water Security

Objectives and Challenges:

Desert city world-renowned for water management. Value and conserve the water supply that allows sustainability of the region and its residents. Education in the efficient use and management of water. Infrastructure for the reuse of treated water. A city that values and conserves regional water supply sources (watersheds, aquifers) for ecosystem equilibrium. A city where the population is educated in the efficient use and management of water.



Strategy Examples:

■ 1) Multidisciplinary assessment of water use and management through remote sensing products, ■ 2) construction of reused water pipeline, ■ 3) increase water rates, ■ 4) implementation of automated irrigation systems in green areas, ■ 5) automated water leaks monitoring, ■ 6) infrastructure to move and collect rainfall, ■ 7) new pluvial infrastructure in future growth areas respecting natural creeks, ■ 8) automated system of water quality of supply sources, ■ 9) reduction of impervious surfaces, ■ 10) management plan of basins and aquifers.

Adaptive Scenarios

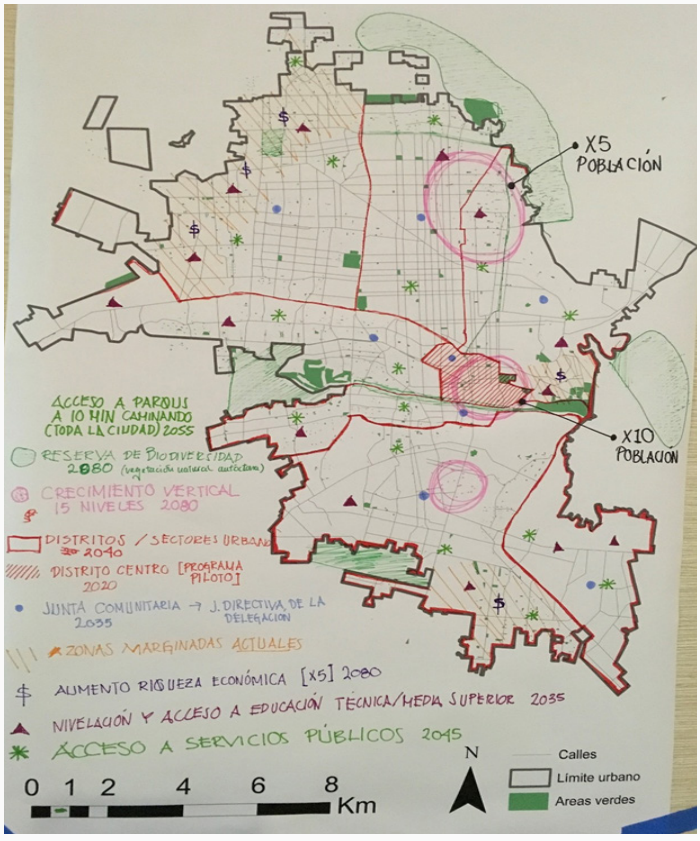
Safe City

Objectives and Challenges:

Hermosillo safe, sustainable and reliable. Neat and clean city and an organized and inclusive community.

Strategy Examples:

■ 1) Eliminate income inequality, ■ 2) promote effective coordination between public sectors, ■ 3) conservation of public infrastructure through a community-based system, ■ 4) temporal employment programs, ■ 5) restoration of city access roads, ■ 6) reduction of greenhouse gases, ■ 7) parks located within 10 minutes from home, ■ 8) complete streets in all main boulevards, ■ 9) efficient and reliable public transportation system, ■ 10) reduction of road accidents, ■ 11) increase population density, ■ 12) parallel governance between population sectors, ■ 13) urban autonomy, ■ 14) improving management of migrant flow.



Adaptive Scenarios

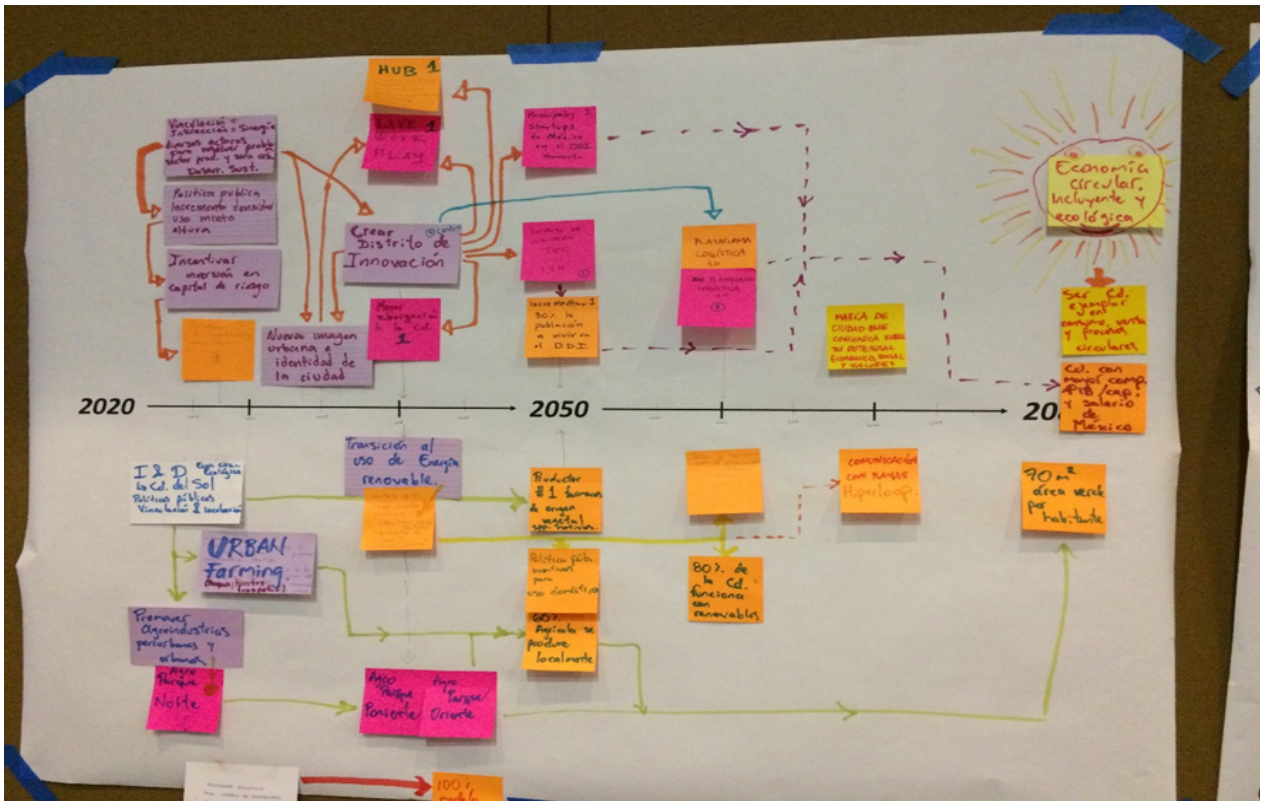
Economic Innovation & Competitiveness

Objectives and Challenges:

Electric and knowledge city. Innovation platform valuing all areas of knowledge industry and urban services. City of the sun employing clean energy and sustainability agriculture. Art and culture hubs.

Strategy Examples:

■ 1) Creation of innovation district, ■ 2) 70% of houses operating sustainably, ■ 3) education model based in innovation, ■ 4) development of business culture, ■ 5) employment of technology in agriculture, ■ 6) 50% of electric cars by 2050, ■ 7) main software development campus by 2030, ■ 8) 80% of the population uses public transportation system, ■ 9) 80% of the city works with solar energy, ■ 10) promotion of urban farming.



Adaptive Scenarios

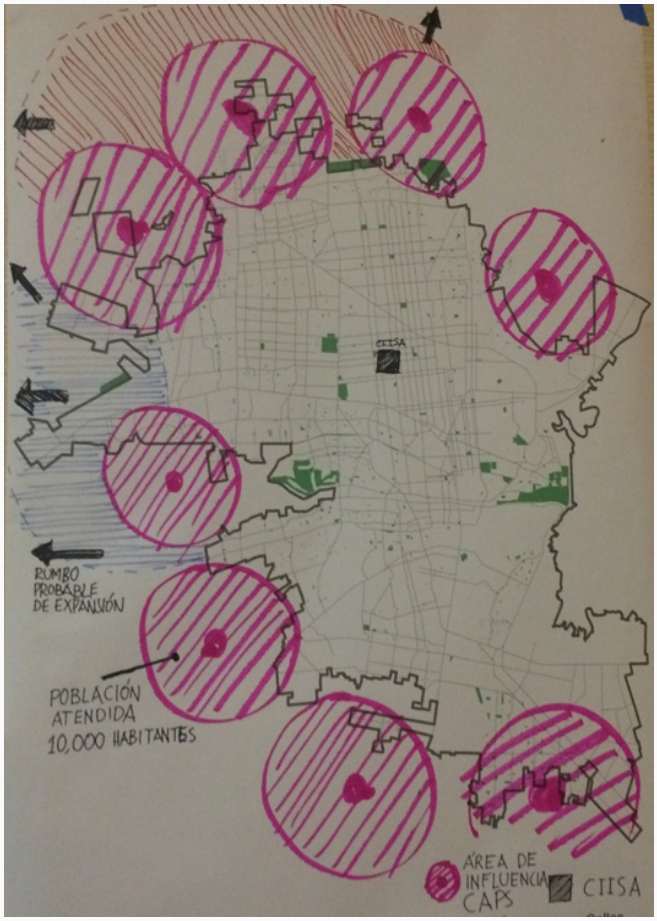
Environmental Health

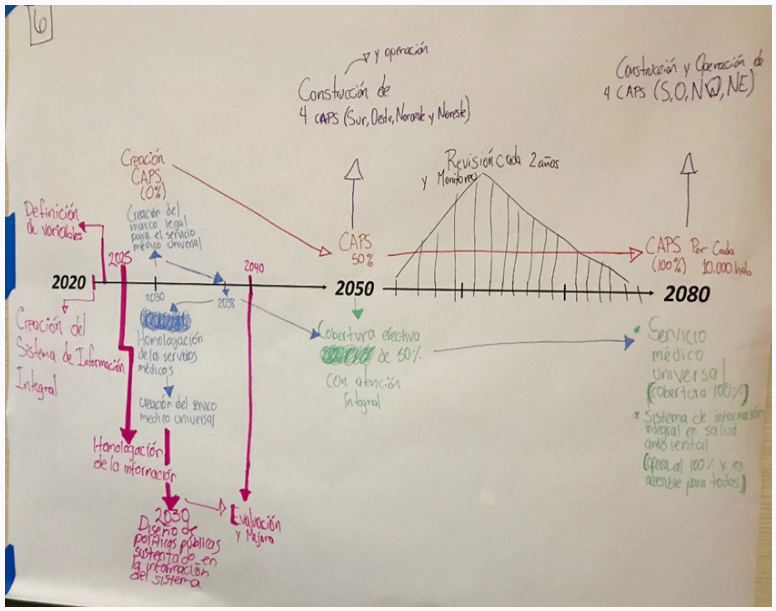
Objectives and Challenges:

Improve the health system through a universal system of coverage. Implement green infrastructure strategies. Mitigate and control contaminants in the air, water, ground, etc. Create an integral information system about environmental health.

Strategy Examples:

■ 1) Increase the number of centers for primary health care distributed throughout the city, ■ 2) Create more green areas, like parks that include a lot of green areas that one can irrigate with recycled water, ■ 3) Campaign for the concentration of trash management in place and industry to discard, reuse, and recycle, ■ 4) Diversify the menu of energy options, ■ 5) Coordination between different levels of government, NGOs, citizens, to implement the environmental health system, ■ 6) Construction and improvement of transportation routes in the city and region. Improve the evacuation routes and accessibility, ■ 7) Provide at least one water treatment plant for each city.





Next Steps

The UREx SRN modeling and visualization teams will take the results of the workshop scenarios to develop a quantitative model and other visualization approaches to project the urban infrastructure of Hermosillo in 2080 incorporating visions defined in the workshop. The models will be presented in a second workshop, planned for early 2020, to evaluate the results of the models through a multi-criteria assessment that allows participants to refine strategies. We hope that the second workshop will lead to new ideas, initiatives, and connections that support the different sectors and organizations that are leading efforts to promote sustainability and resilience in the city of Hermosillo.

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Participating Institutions & Organizations

ITSON · Ayuntamiento de Hermosillo · IMPLAN · Arizona State University · NSF

UREx SRN

UREx SRN's Mission

Our mission is to connect scientists and practitioners to create resilient infrastructure with information, models, images, maps, histories, and projects from 10 cities, accelerating the production of knowledge and the implementation of innovative and sustainable solutions in urban ecosystems.

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