Research Paper

HOW TO GRASP THE POWER OF THE PLACE:

The TELLme Project and Metro-dology

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Abstract

Metropolitanisation processes caused by unplanned urban growth have generated an enormous demand for infrastructure and services, as well as impacts on the environment that can lead to imbalances in social development. In order to promote sustainable growth, it is necessary to plan a fair distribution of services throughout the development of the city with efficient infrastructure system. Our answer is a proactive project, which holds the social and ecological function of the city that restores safe environmental conditions. In the ongoing TELLme Erasmus+ project, we attempt to define a holistic methodology, the Metro-dology; structure a training lab where academia and practitioners can discuss the issues, principles, and gaps of the metropolitan area; and develop mapping tools to comprehend the metropolitan complexity and support the training. We are looking for new relations among the parts of the city through first, mobility project to transform the times of the city; second, identification of suitable places for the production of a modern and clean circular economy; and finally selection of areas for urban regeneration to rediscover and renew the identity of the metropolitan city.

Keywords

metropolis, TELLme, metropolitan complexity, metro-dology

1. The Complexity of Contemporary Metropolitan Issues

1.1. Contemporary Debates on Metropolitan Issues

Rapid urbanisation has been one of the urgent issues across the globe in the past few decades. As a consequence, more and more cities are now becoming part of larger metropolitan areas. As the growth and the environment resemble nothing of the past events, it is essential to distinguish the new metropolis and understand the difference from a traditional city.

In the early 20th century, to describe the extensive urban scale change triggered by the industrial revolution, the word 'metropolis' reappeared in the Western world with more modern meaning. It described the urban expansion that had been occurring at different times in different locations around the world over the past two centuries. In this context, the use of the term metropolis emphasised the size of the city that had changed. Otto Wagner and Ludwig Hilberseimer were amongst the first scholars who raised the issue of the Großstadt,

that is the "big city", in reference to the change of measure and scale of the urban settlements in the wake of the industrialisation in the western world.

The phenomenon of the contemporary metropolis, however, differs from the modern industrial "big city". The unrestricted urban growth we are experiencing nowadays has exceeded the timeframe of planning. The nowadays concept of the metropolis is related to a measure and scale which is not associated with human dimensions or commensurate with the urban fabric and the density parameters represented in the concept of proximity. "Metropolitan" as a category is related to a context of mass mobility of people and goods, which implies a different relationship between individuals and groups. The technological utopia, embodied through the spreading of metropolitan infrastructure networks and the overlapping natural universe, has erased previous continuous geographical traces and has disarticulated agricultural and urban historical topological patches. As a result, we may notice a sense of loss of productive and symbolic connotations of the cultivated land.

Moreover, the main drivers of urban development in the past two centuries were not the physical shape of the city but external logic such as economic models, political agenda, and technological optimisation. These growth models focusing on the efficiency of growth demonstrated their limits in addressing the quality of the well-being of the citizens. The prevailing inequality has escalated the conflict amongst groups of people around the globe where existing urban spaces have not been able to accommodate the incoming population. Unplanned occupancy in areas such as main water basins that serve the entire city became a risk for all inhabitants, only exacerbated by the effect of global climate change. The colonial past, on the other hand, has cast long shadows over many of the developing countries to struggle with not only the physical, social, and economic difficulties but also with the cultural identity of the population.

These backgrounds of extreme urbanisation leave us with the big question of how to deal with the metropolitan complexity to realise sustainable growth to reach the well-being of the population in the post-colonial, Anthropocene era. Metropolitan Complexity refers to the issues of the contemporary metropolitan system. Social and economic inequality, the fragility of environmental eco-systems in relation to the global climate change, the emergence of the political idea of the metropolitan dweller as a global citizen, the preservation of cultural heritage; the post-colonial identity, and the governance and policy issues are only a few of these issues framing the Metropolitan Complexity. These issues cannot be addressed with a single, static, and traditional disciplinary approach, but needs a comprehensive and multidisciplinary vision to understand them.

1.2. The TELLme Project and the Metropolitan Approach to Complexity

The TELLme (Training for Education, Learning and Leadership towards a new MEtropolitan discipline) is a three-year Erausmus+ project started in 2017 where the cooperation for innovation and the exchange of good practices are the key actions. The project addresses the urban and architectural disciplines at the higher education level, based on the assumption that cities in the 21st century are the crucial field of complex issues derived by the extreme urbanisation and the HEIs have a social responsibility in providing solutions.

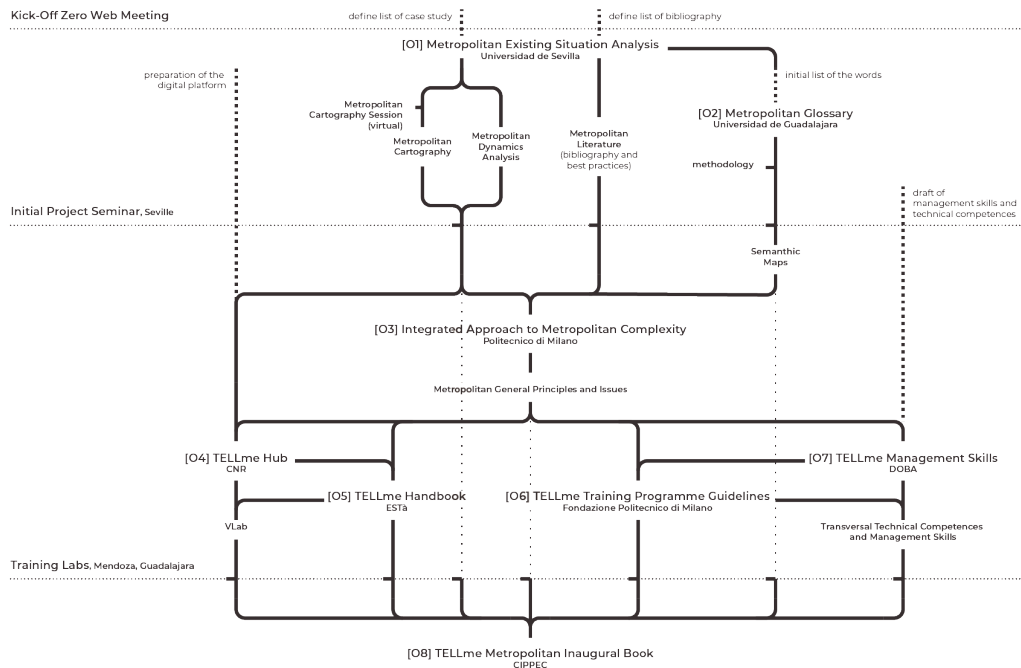PROGRAMME OUTLINE
Intellectual Outputs Framework

Kick-Off Zero Web Meeting   define list of case study   define list of bibliography

[O1] Metropolitan Existing Situation Analysis
Universidad de Sevilla

preparation of the
digital platform

Metropolitan
Cartography Session
(virtual)

Metropolitan
Cartography

Metropolitan
Dynamics
Analysis

Metropolitan
Literature
(bibliography and
best practices)

[O2] Metropolitan Glossary
Universidad de Guadalajara

initial list of the words

methodology

Initial Project Seminar, Seville

draft of
management skills and
technical competences

Semanthic
Maps

[O3] Integrated Approach to Metropolitan Complexity
Politecnico di Milano

Metropolitan General Principles and Issues

[O4] TELLme Hub
CNR

[O5] TELLme Handbook
ESTa

[O6] TELLme Training Programme Guidelines
Fondazione Politecnico di Milano

[O7] TELLme Management Skills
DOBA

VLab

Transversal Technical Competences
and Management Skills

Training Labs, Mendoza, Guadalajara

[O8] TELLme Metropolitan Inaugural Book
CIPPEC

Figure 1 TELLme Intellectual Output Framework

Ten partners and four associate partners from Europe (Italy, Spain, Slovenia) and Latin America (Mexico, Argentina) are working on developing the theoretical framework, methodology, and tools to address the metropolitan complexity holistically. The eight outputs range widely from the theoretical studies to practical training guidelines, yet closely linked to one another through framework and methodology of the Metropolitan Discipline. (Figure 1)
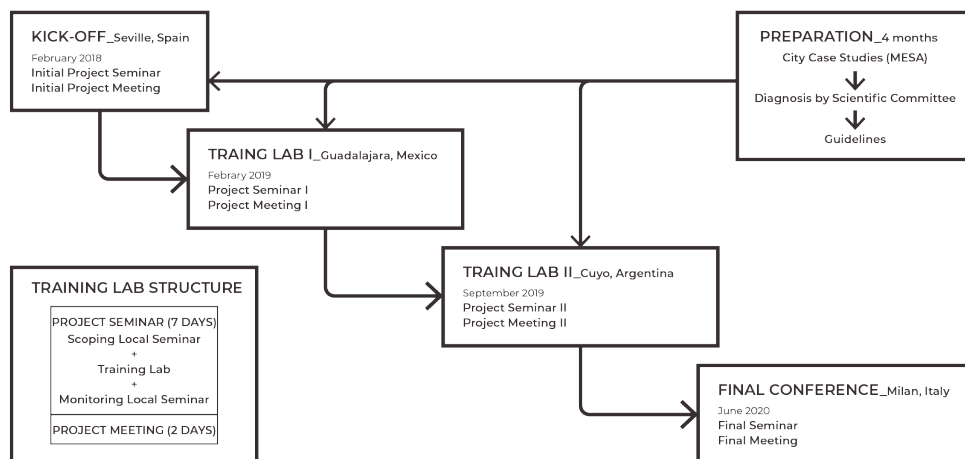
KICK-OFF_Seville, Spain

February 2018
Initial Project Seminar
Initial Project Meeting

PREPARATION_4 months
City Case Studies (MESA)
↓
Diagnosis by Scientific Committee
↓
Guidelines

TRAING LAB I_Guadalajara, Mexico

Febrary 2019
Project Seminar I
Project Meeting I

TRAINING LAB STRUCTURE

PROJECT SEMINAR (7 DAYS)
Scoping Local Seminar
+
Training Lab
+
Monitoring Local Seminar

PROJECT MEETING (2 DAYS)

TRAING LAB II_Cuyo, Argentina
September 2019
Project Seminar II
Project Meeting II

FINAL CONFERENCE_Milan, Italy
June 2020
Final Seminar
Final Meeting

Figure 2 TELLme Training Schedule

In particular, there are two training labs where we test the methodology with actual case studies involving local government and stakeholders. (Figure 2) During the training lab, besides identifying the urgent metropolitan issues of the location, all participants provide feedback and discuss further project developments. The expected impacts of the TELLme project are:

- A multidisciplinary and trans-national collaboration, sharing knowledge, skills and best practises, developing new tools will directly improve the involved HEIs in their capacity to address the Metropolitan Discipline

- Building a community of practice of the discipline amongst higher education institutions through technological innovations that interact with local governments, NGOs

In order to define the metropolitan approach, it is crucial to recognise the paradigm shift from the urban to the metropolitan scale, thus seeing the contemporary metropolis as a "net-city". According to D. G. Shane, the Net City is "a multi-centred network system" emerged "to handle the apparently chaotic flows of diverse participants in an increasingly global network." The Net City is essentially a system of cities of different sizes functioning as a whole throughout a network of physical and virtual infrastructures. (Figure 3)

Figure 3 Milan PGT, Metrogramma, 2007

In this polycentric system, however, we are not only dealing with the nodes and edges of the network. According to authors such as Terry McGee, Edward Soja, Neil Brenner, and many more, we are facing a hybrid territory where urban and rural scales define a seamless heterogeneous landscape. This space in-between the network is called "body space", where the continuity and the connection with the previous system are lost due to metropolitan infrastructure systems. The Body Space needs to be reconceptualised with new meaning and new image in the metropolitan era.
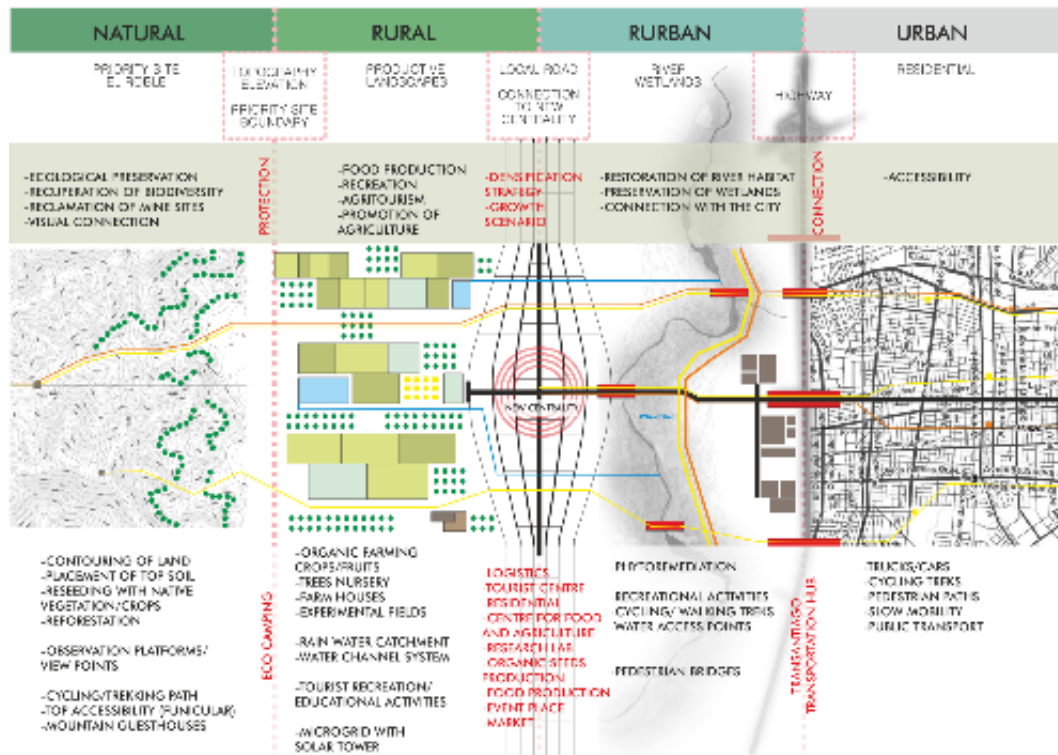
Figure 4 Urban-Rural Linkage Pattern Study, MS Lab 2018

The recognition of "body-space" allowed us to discover new patterns of settlements that are beyond the dichotomy of urban and rural patterns. (Figure 4) It opened the whole new possibilities of shifting between different scales and time that require new spatial practices, social behaviours, and organisational structures. This change also fostered engagements of new spatial agencies such as private and public organisations, universities, families in the interactions amongst global and local forces challenging fixed administrative boundaries at different scales and requiring innovative forms of institutional organisation, and planning.

The necessity of a comprehensive and multidisciplinary approach to the study and practice of metropolis became a common ground for our academic exchange in the past years. The metropolis spatial structure needs a Metropolitan Discipline able to support its construction with organisational, technical expertise, and a big project of urbanity based on a physical and virtual network between the new city shape and the new forms of conviviality. The metropolitan vision will lead to the improvement of the Practice of the Metropolitan Discipline (figure 5) with new competencies.
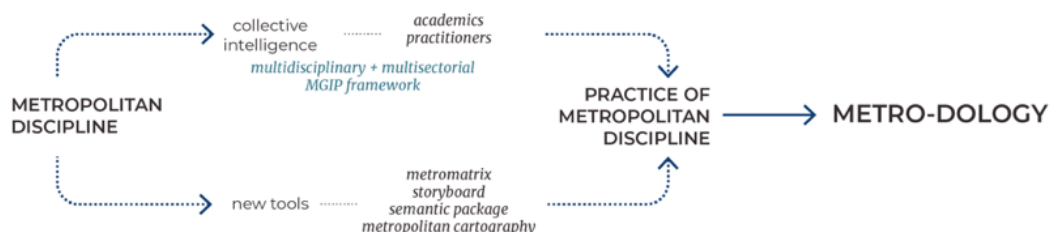
Figure 5 Practice of Metropolitan Discipline

2. The methodology for the Practice of Metropolitan Discipline

2.1. Metropolitan General Issues and Principle (MGIP)

The aim of the Metropolitan General Issues and Principle (MGIP) framework is to create a feedback mechanism where practical experience is reflected in the theoretical work of the Metropolitan Discipline, taking the local environment, community, wealth, governance, and culture dimensions into consideration. Within this basic structure, the collaboration of the collective intelligence yields holistic solutions addressing all dimensions of the metropolis.
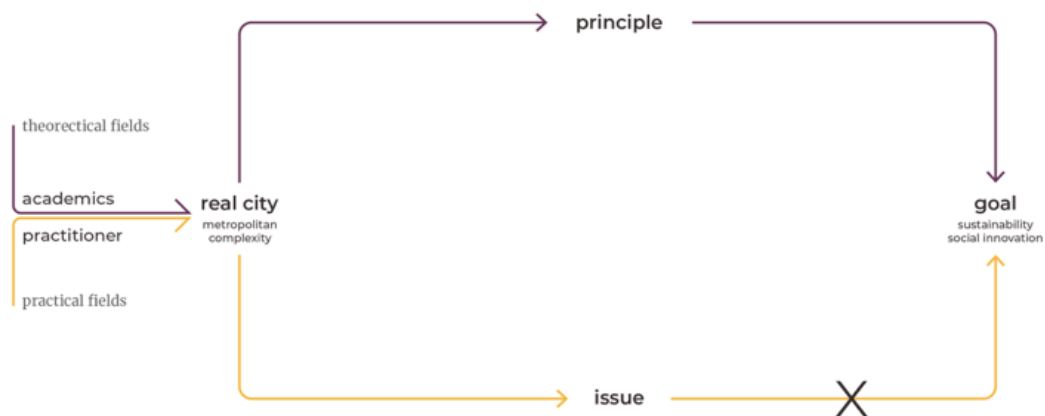
Figure 6 Current Situation in the Metropolitan Practice

The reality indicates the existing situation of a built metropolis. It is the starting point of acknowledging the issues to address, and the principles ruling the specific context. The goal is the ideal objective of a metropolis, which is ultimately the sustainability of the metropolis for the wellbeing of its citizens. From the literature and the case studies, academics set the principles that define what to achieve, how, and why for reaching the goal. On the other hand, practitioners face the issues, which are the undesired outcome of a metropolitan dynamic and often act as a hindrance for meeting a metropolis expectation. (Figure 6)
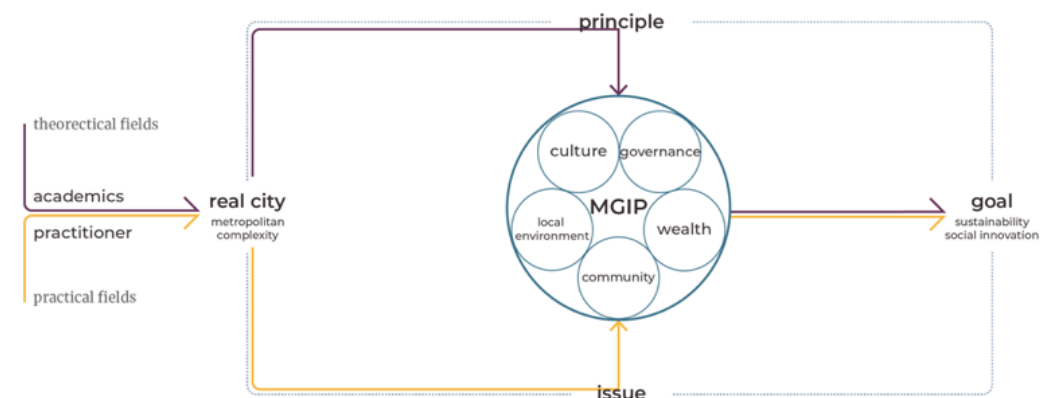

Figure 7 The Proposal of Metropolitan General Issues and Principle (MGIP) Framework

The reconnection of the ideal city with the real built city in the MGIP framework (Figure 7) comes through the process of operator and operation that bring the principles and issues together for finding how to transform, develop, or maintain the existing situation and reach

the goal of sustainability. From this perspective, both the theoretical field of academic knowledge and the practical field of the governance and management of a metropolis are equally acknowledged. The framework attempts to merge the field experience with the theoretical issues of the complex process in Metropolitan Projects by translating the general and theoretical point of view into the more specific practical operations in the metropolitan construction.
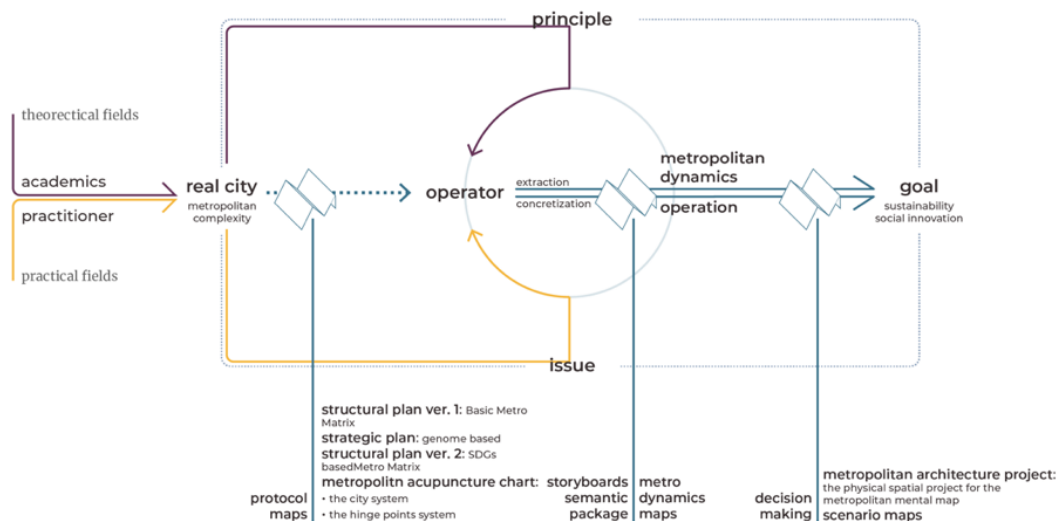

Figure 8 The Tools used in each step of the MGIP Framework

Each step of the framework requires specific tools as part of the methodology and the framework to bridge the gap between the theory and the practice. (Figure 8) Narrative and mapping tools that allow the study of the metropolitan phenomena with a multi-disciplinary and multi-sectoral stakeholder becomes another main pillar of the discipline.

A feedback mechanism follows after the initial establishment of the MGIP framework, where practical experience will be reflected in the theoretical body of the Metropolitan Discipline, taking into consideration the local environment, community, wealth, governance and culture dimension. These categories seek to understand the metropolitan question from a holistic standpoint, in contrary to the traditional methods that have a vision that comes from the sectors in the way which academy and local governments are organized. This gathering of knowledge is the fertile soil that gives place to Metropolitanism: the capacity to give a comprehensive solution rather than a sectoral answer to the problems related to the management of large metropolitan areas.

2.2. Metro-dology

Metro-dology is the collective design process of the Metropolitan Architecture projects based on the MGIP framework. (Figure 9) It is a sequence of phases implemented with specific tools that support the decision-making process of the physical transformations of a metropolis through the building of a metropolitan narrative. The result is a metropolitan narrative, which is not meant to be a linear process, but consists of different phases that relate to each other through a feedback mechanism: Narrative, Interpretation/Diagnosis (Protocol Maps & Metro

Matrix (Ortiz, 2013)), Dynamics, Storyboard, Glossary, Metropolitan acupuncture chart and Metropolitan Project.
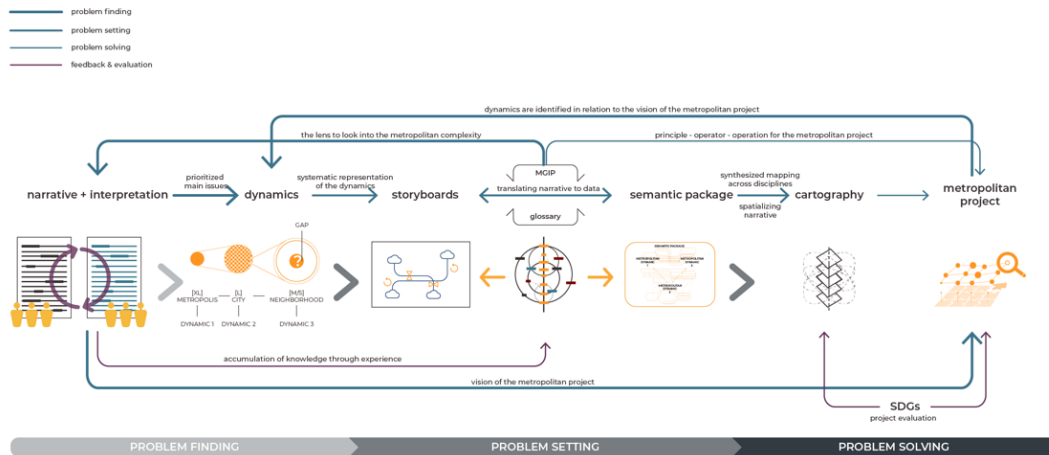

Figure 9 The Metro-dology

The Metro-dology is applied to metropolitan contexts that are a territorial assemblage of rural and urban patterns of settlements; infrastructural networks merging with the natural elements; and the historical traces of places and producing hybrid landscapes that are the new living environment for billions of metropolitan citizens. In order to build a multi-dimensional and multi-scalar narrative of these territories, it is essential to investigate the complexity of a metropolis.

Following the definition of a stakeholder's map, through a workshop dedicated to this phase, we first set up a comparison between a pool of experiences of the different actors of the metropolitan city (Issues) and a reference to principles of general sustainability (Principles) expressed through words and key concepts. Throughout the process, the cartography tool spatially highlights the data that are the premises for orienting metropolitan planning.
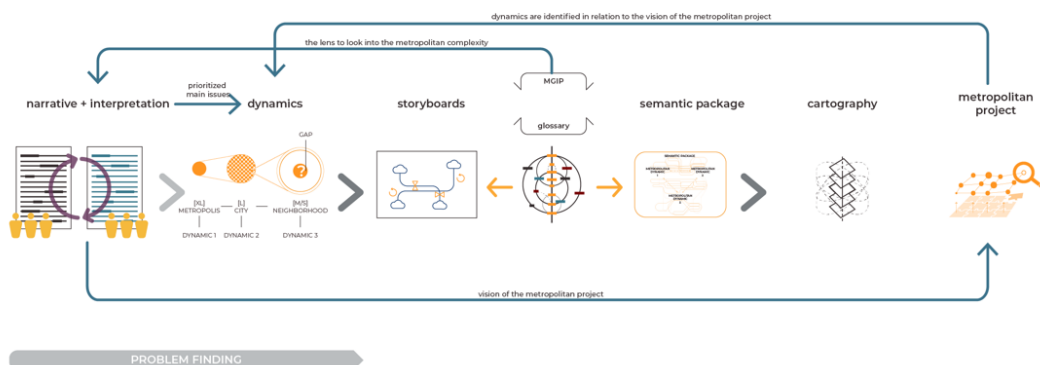
Problem Finding

Figure 10 Metro-dology: Problem Finding Phase

Problem or Fact-finding is the first phase of the Metro-dology. (Figure 10) It starts with the narrative of internal experts, namely local decision-makers and civil servants of a metropolis.

They describe the problems, needs, and expectations of their metropolis and the tools available to address them. Metropolitan experts, who are external experts, analyse the storytelling in a constant dialogue with local authorities and have an insight into the problems of the metropolis and of the processes that may produce them.

Simultaneously, a primary study of the metropolis is conducted. By using the global data set, the Metropolitan Cartography tool generates a set of Protocol Maps that become a base for discussions. Protocol Maps are a set of maps showing the fundamental relationship amongst elements constructing the metropolitan system. They reveal the metropolitan structure by layering physical aspects of geographic, historical, and geometrical data. All metropolises have the same set of comparable maps.
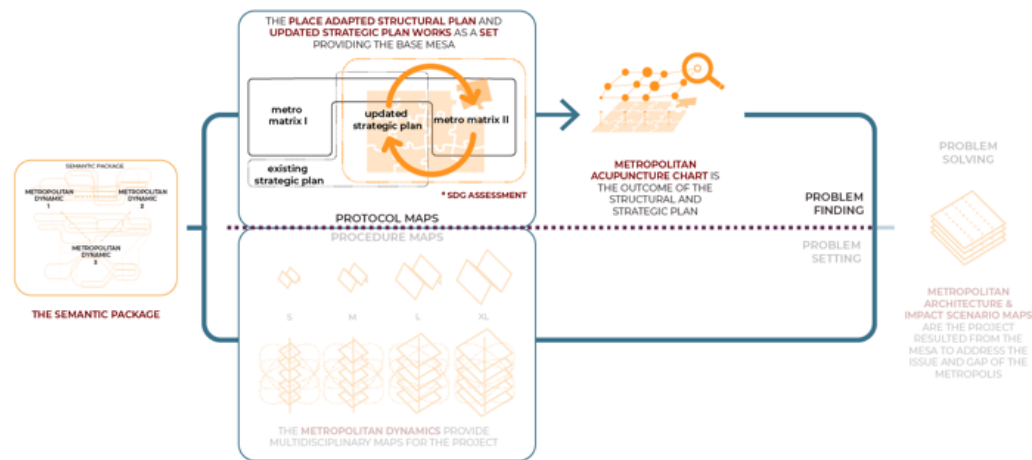

Figure 11 Protocol Maps, Metro-Matrix, and Metropolitan Acupuncture Chart

From the Protocol Maps, the Metro-Matrix is produced. It is a reticular system of axes: few structural geographical axes and some penetrative artificial ones, which first, determine the development of the centre along lines and, second, define hinge points of densification. The matrix assumes its value through the definition of the logic of settlement-distribution, which makes possible the localisation of interchange nodes in peripheral areas. (Figure 11)
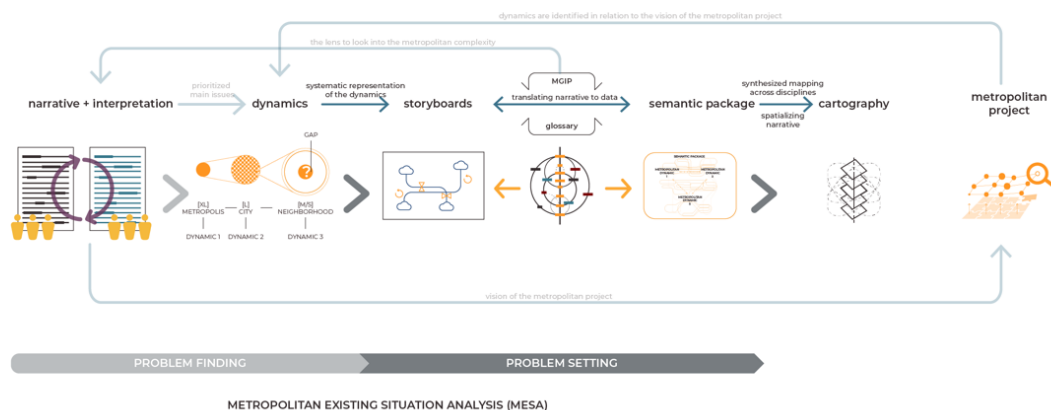
Problem Setting

Figure 12 Metro-dology: Problem Setting Phase

The subject of the problem setting is the metropolitan city and its dynamics. (Figure 12) The local actors selected based on their actual involvement in decision-making of a metropolitan area, have chosen a metropolitan transformation, report verbally on the issues (challenges, strengths and weaknesses, gaps and tools used) that affect the expectations of their city and their limits.

The objective of the narrative is to create a complex of observation plane conditions in which data provided exclusively by the local subject are integrated with spatialized data and presented through open source maps. All the data, therefore, are initially observation data, analysed by the metropolitan expert through the general principles agreed upon based on the Metropolitan Genome (Ortiz, 2013).

Once the observation data have been collected, then, through the dialogue conducted in working tables, the process of correlation and interpretation takes place. The metropolitan experts describe the dynamics through a synthesis scheme called a storyboard, an interpretation of the process of the cause of the issue that emerged during the discussion. The storyboard represents the big picture of the issues of a given metropolis and of the dynamics that produce them.

Based on the storyboard and the semantic package, procedure maps are produced. Procedure Maps are a set of maps representing the spatial impact of the process of ongoing metropolitan dynamics identified during problem finding phase. They operate at a large scale and aim at highlighting the dynamics and defining strategies for promoting the sustainable development of the metropolis.

The result of Problem Setting phase is the verification of the hypothesis of the metropolitan dynamics produced with the tools of the TELLme project and identification of further metropolitan project themes and its development hypotheses.
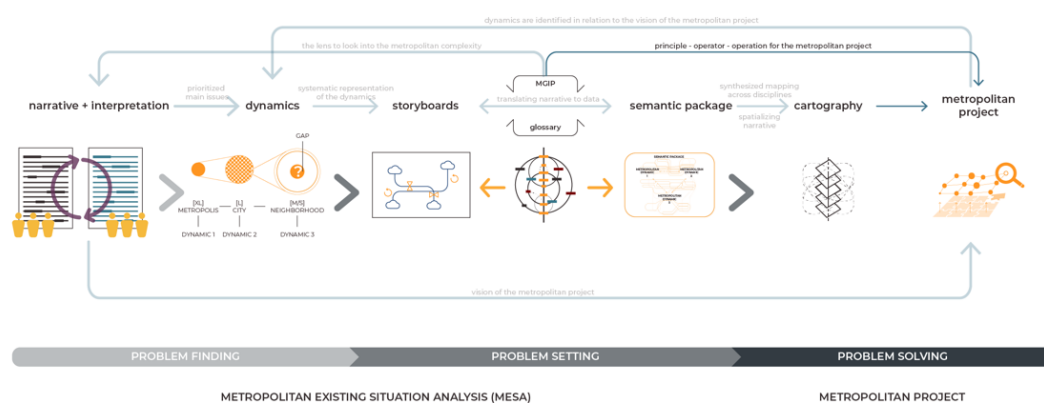
Problem Solving

Figure 13 Metro-dology: Problem Solving Phase

In the problem-solving phase, (Figure 13), the metropolitan architecture projects are developed through site-specific operations as a response to the existing gap and in relation to their potential location defined with the metropolitan acupuncture chart. Nevertheless, the latter act as a framework that stresses the value of the metropolitan architecture projects in

building the connections between the big scale of the metropolitan network and the archipelago of the local scale of places to enhance our experience in the space-time of the metropolis.

Maps are also instrumental in the final decision-making act. The use of data enables the production of Impact Scenario Maps that simulate long-term scenarios of metropolitan development to evaluate the impact of Metropolitan Projects on the territory.

The metropolitan dynamics transform existing landscapes, infrastructure networks and city fabrics. The dynamics are processes of transformation of form and map of the urban field on a metropolitan scale. Growth through densification and investment of larger spatial fields change the value of the existing poles and settlement patterns, concerning the new metropolitan paradigm. For this reason, Metropolitan Architecture needs to protect the local value, and also be equipped with "sensitive" infrastructures so that they do not remain or are uprooted or "museumised".

3. Guadalajara Case Study

The case of Mexico offers a unique opportunity to observe how and why drastic change is occurring in migration patterns. The case study of Guadalajara is a result of the TELLme Training Lab held in February 2019. The aim of the training lab was to test the problem finding and setting of the Metro-dology by identifying the issues and dynamics of the metropolitan region with the local government, academia, and local stakeholders, and verifying them with the Metropolitan Cartography tools.

3.1. Problem Finding

The project began with comprehension of the city's geographical position and geopolitical role as an attracting point by identifying possible reasons and directions of migration, and the city's capacity in handling its growing population, land use and ecological footprint. The city's economic growth and social connections are the mechanisms that facilitate migration and determine the scale of impact.

Guadalajara is the second most important city in the centre-west of Mexico, capital of the State of Jalisco. It is also the place of origin of mariachi and tequila, and one of the most important industrial and commercial centres of Mexico: some even call it the Mexican Silicon Valley. The agglomeration that forms the metropolis has around 4.1 million inhabitants. The city of Guadalajara has started to grow again (0.09 %/year), after a period of decline from 2000 to 2014. Today, even though the population growth until the last survey seemed stabilized, the whole metropolitan area shows an expansion in terms of land consumption that has generated sprawl, and illegal occupation of natural and agricultural areas.

The first analysis started with a set of protocol maps to achieve a structural plan of Guadalajara that reveals the relationship between different municipalities and their roles in the metropolitan region. (Figure 14) Guadalajara has a strategic geographical position for the relationship between the two oceans. Today, it is also in a position of the junction between

the axis that connects the city to Mexico City and the axis that connects Guadalajara with the port of Manzanillo. (Scale XL)
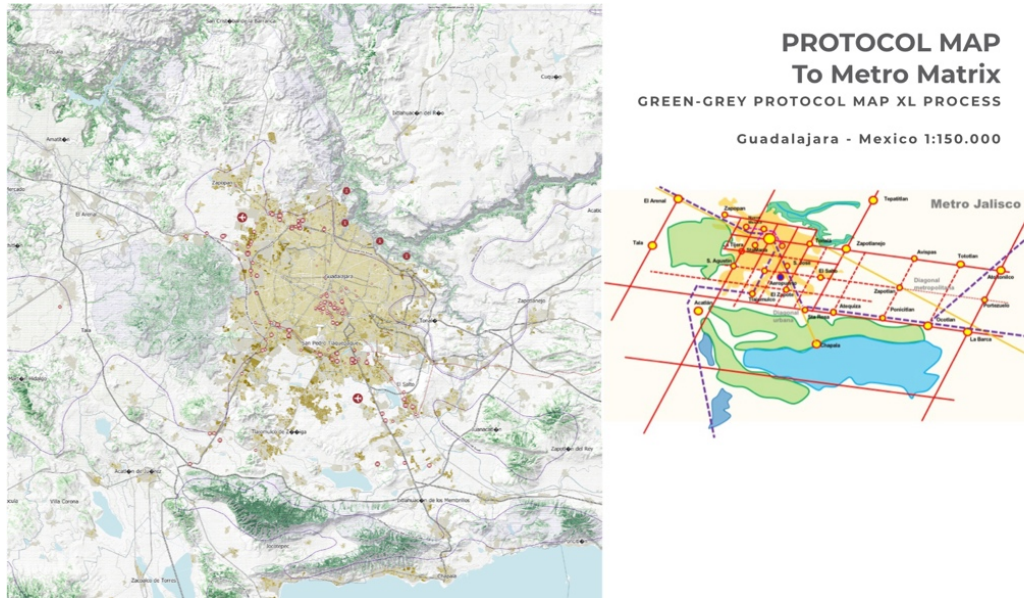

Figure 14 Protocol Map and Metro Matrix of Guadalajara (XL Scale)

After the discussion with local actors such as the universities, municipalities, civil society, and IMEPLAN (Instituto de Planeación y Gestión del Desarrollo del Área Metropolitana de Guadalajara), and based on the Protocol Map and the Metro Matrix, we observed the formation of a metropolitan axis in the metropolitan region of Guadalajara in the L scale (Figure 15): Villa Corona - Acatlán de Juárez - Tlajomulco de Zúñiga. Each municipality has its strong characterization within this axis: Villa Corona is a tourist resort, whereas Acatlán de Juárez has the freight railway that connects Guadalajara to the port of Manzanillo, and Tlajomulco de Zúñiga is an airport city.
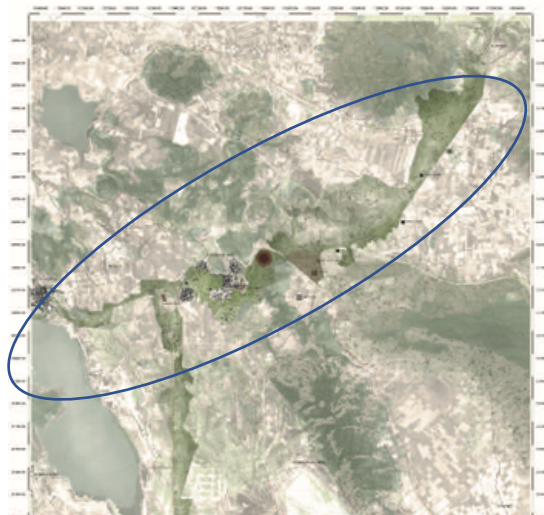

Figure 15 The New Metropolitan Axis of Villa Corona - Acatlan de Juarez - Tlajomulco de Zúñiga (L Scale)

Finally, at the M scale, the area between Villa Corona and Acatlán de Juárez is chosen as a strategic position for the relation with Guadalajara and the Manzanillo Valley. (Figure 16) Since its proximity to the railway station for freights, with a provision of conversion to a passengers station, the area is defined as a buffer zone, that is, the area under tension between three different physical states generating abandoned areas, infrastructural barriers, and informal settlements: City (Guadalajara), Agriculture (Valle del Manzanillo), and Nature (Lagoon). In the area, due to the increasing housing demand from all social levels, there is a planning proposal for mass residential development. The identification of this threshold as an urban-rural linkage landscape that interacts with other existing landscapes, networks and fabrics, encouraged the participants to consider a type of settlement can merge the urban and rural landscape.

Figure 16 The Field of Action between Villa Corona and Acatlan de Juarez (M Scale)

3.2. Problem Setting

After defining inequality and fragility of the territory as the main issues, the participants worked on defining the dynamics causing the issues. The following discussion was focused on answering the following question: Considering the vulnerability of the territory, is it possible to determine sustainable locations for metropolitan residential projects? Based on the initial survey, the TELLme team prepared the procedure maps as a base for discussion. As a result, the participants defined the following dynamics, varying in scale:

- Dynamic 1: The conversion of agricultural land to urban and peri-urban settlements. (Urban-Rural Linkage XL scale)

- Dynamic 2: The expansion of settlements within the valley and the development of small centralities due to a robust localisation of mining centres and productive food processing industries. (Urban-Rural Linkage L and M)

The issue that we started in the Guadalajara-Acatlan de Juárez-Villa Corona area is related to the intensive exploitation of agricultural land due to the presence of red fruit production managed by American multinationals. This production, which has led to a substantial increase in the standard of living of the populations involved in its management, has also caused a significant eutrophication of Lake Chapala with a consequent reduction in the size of the lake, a worsening of the landscape conditions, and now recognised health problems for the indigenous people who lived in the lake (respiratory diseases and malformations).
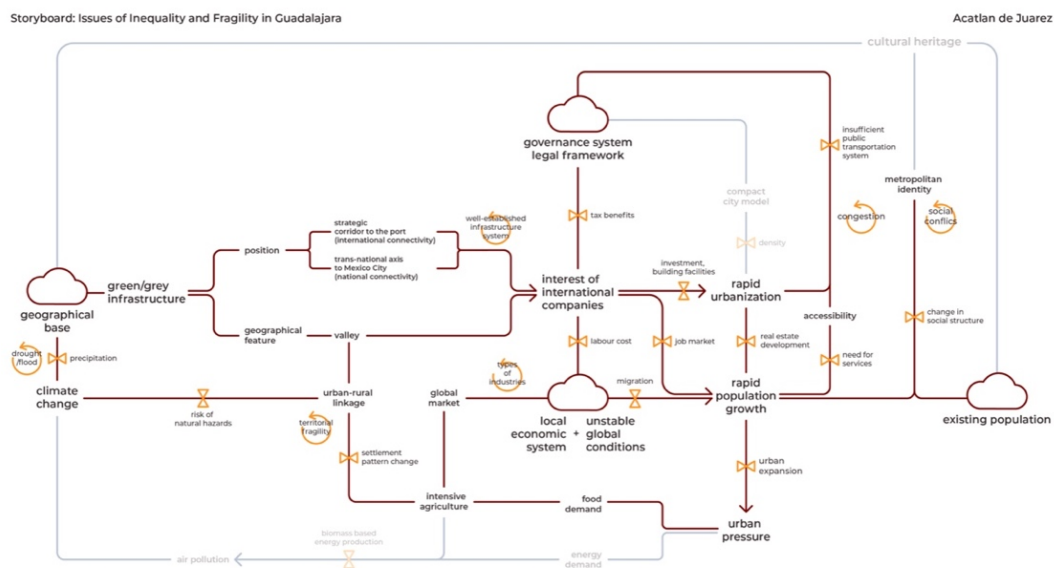

Figure 17 The Storyboard of Dynamic 2: The expansion of settlements within the valley and the development of small centralities due to a robust localisation of mining centres and productive food processing industries

The loss of local markets and knowledge of the cultivation of local products (for example, amaranth) is a possible consequence of having opted for a single international client. From the social point of view, internal and external immigration will focus on an area that is already characterised by the presence of indigenous communities living on the edge of poverty. (Figure 17)

The agricultural vocation of the area is confirmed by the presence of the Metropolitan Trail of Acatlán de Juárez, which had to solve the problems of compliance with the Official Mexican Standard for Treatment of Wastewater Discharges that the municipal rakes did not guarantee to observe. The Metropolitan Trail, which cost 1000 million pesos, however, was only operational for 13 months, due to problems of management and adequate treatment of water; It was the primary source of work for 250 families.

The presence of this plant has caused an increase in demographic pressure in the town of Acatlán de Juárez. This pressure could increase if the hypothesis of implanting the Mexican "Silicon Valley" in Acatlán took shape. The State of Jalisco puts great emphasis on technology. It annually exports the equivalent of 21,000 million dollars in services and technological

devices and, between 2014 and 2016, hundreds of new companies in Guadalajara have received investments -most of US origin- amounting to about 120 million dollars, according to Washington Post. The evident vitality of the territory has also attracted the attention of large companies, and multinationals in the information technology sector, which have decided to open their offices there: Intel, IBM, Hewlett-Packard and Dell are present in Guadalajara and its surroundings.

Based on the storyboard produced by the external expert team after the discussion with stakeholders, the key elements of the dynamic were highlighted in the semantic package. The semantic package is a list of keywords that refers to a set of data, the informative levels, which becomes the legend of the maps describing the phenomena produced by the metropolitan dynamics. To represent a given phenomenon, data within different catalogues are selected through transversal "zone of reading". The storyboard is translated into a Semantic Package by selecting the informative levels representing each element of the storyboard. (Figure 18) Experts in various fields provide the connection amongst the main keyword and the data keywords.

Figure 18 The Semantic Package of Dynamic 2: The expansion of settlements within the valley and the development of small centralities due to a robust localisation of mining centres and productive food processing industries (M Scale)

The Procedure Map reveals the physical dimension of the identified dynamic. Related to the dynamic 2 of Guadalajara, the maps seek to highlight the following aspects (Figure 19):

• Connectivity intercepted by the presence of federal roads, regional roads, municipal roads and rural roads, by rail and by the electricity grid;

• Natural Resources intended as a green system that demonstrates a discontinuity in its extension through a limited number of protected vegetative species, agricultural soils and rural settlements;

• Informal and urban-rural settlements and the relative urban growth understood as the settlement pressure that every single urban centre exerts on the territory: Public services and

the degree of social marginalisation make it possible to give a quantitative and qualitative connotation to the area;

• Water governance through the identification of the main surface and underground water flows (blue system) and water collection points divided according to their use (pastoralism and agriculture, industry, public): The network of telecommunications determines virtual flows that generate networks with interchange points with a high level of accessibility;

• Circular economy of the area represented through land specialisation and land use: Spatialization of agricultural activity is readable through the actual growth of recorded production and the mapping of potential agricultural areas.
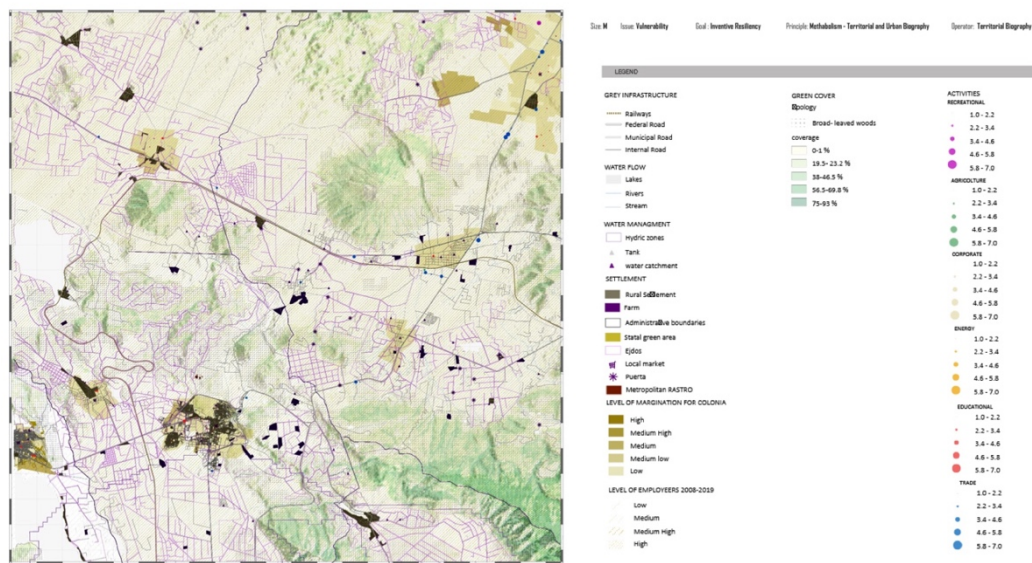

Figure 19 Procedure Map of Dyanmic 2: The expansion of settlements within the valley and the development of small centralities due to a robust localisation of mining centres and productive food processing industries (M Scale)

3.3. Conclusion: Direction for Problem Solving

The main result of the Guadalajara Training Lab was that we identified a metropolitan axis beyond the administrative boundary of the Metropolitan City of Guadalajara. The project needs to be further developed in a sustainable accessibility project that allows the community to experience the environment while avoiding the risk of isolation, and the creation of tourism on which it is possible to invest energy and resources to improve cultural and landscape heritage. The community presence is essential in the area assessments because it reflects the agricultural system of the ejidos, a rural area that can be managed privately or publicly. The lands in common use and the fragmented ones define plots, alignments and geometries as signs that affect the soil and determine the landscape.

4. Conclusion

From the analysis mentioned above, starting from the question about the size of the city, each metropolitan aspect is progressively studied, bonded to a scale and framed throughout the steps of Metro-dology. The necessity for the delineation of fields of action (the bounding box) out of the traditional municipal boundaries emerges as a fundamental step to identify the speed of change produced on the different metropolitan dimensions.

A following step of evaluation needs to be pursued to render territorial criticalities and assets and to help future policy-making processes or ad-hoc interventions. Through a multi-scale integrated approach for assessing metropolis impacts and drivers, the Metro-dology allows us to investigate the relationships among the facets of a city over its surrounding territory.

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Acknowledgment