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The Quito Climate Change Adaptation Strategy as a perspective for Governmentality and Social Innovation

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The Quito Climate Change Adaptation Strategy as a perspective for Governmentality and Social Innovation

Summary

The discussion about the implementation of the Convention on Climate Change is strongly determined by scientific and economic factors, particularly in the field of mitigation. While measures in the field of mitigation will certainly be necessary in the future, they should be considered alongside the field of adaptation. Contributions toward this from the social sciences are rare, but they would undoubtedly be necessary for achieving progress in the field of adaptation strategies.

The concept of "governmentality" can be used to show the conceptual contradictions in the basic concepts of the Climate Change Convention, particularly in regard to implementation. These factors likely contribute to the unsatisfactory progress results that are addressed at every COP. The “Local Strategy for Adaptation to Climate Change” of the Ecuadorian capital Quito shows how this conceptual design could be successfully improved. Based on such a snapshot, the approach presented in the "Comprehensive Social Innovation and Modernization of the Metropolitan District of Quito" presents possible scenarios on how or where local knowledge can be better integrated, how processes of social innovation can be triggered by combining existing knowledge, which actors are foreseeably involved in such a process, and where barriers to the implementation of such innovations exist.

From this, a notable contribution presents itself, to not stop at the mere introduction of innovative individual projects for mitigation, where the diffusion of such pilot projects as regarded as an automatic given. An adaptation strategy can also be understood as diffusion of a comprehensive social innovation within in a space and its institutional actors, in which catalysts and barriers to such a process are identified, then strengthened or overcome. As such, it is an application-oriented use of social science knowledge. In addition, the perspective of complementary knowledge between Latin America and Europe is discussed in this context. The individual case-related positive experiences in Latin Ame-rica, and the theoretical conceptual progress in Europe are seen to complement each other in a meaningful way.

This vision, of complementary knowledge and advances made possible by the applied geography approach, represents an important result, since climate change and territorial changes in metropolises are developing a growing momentum of their own, which requires local knowledge and institutional actors with the capacity to analyze and manage. What is needed is to identify key actors, barriers to the diffusion of social innovations and proposals to overcome them. In general, a basic objective of "social innovation" should be underlined; the composition of known fields of knowledge in a new context can also lead to important innovations. This paper presents proposals.

An illustrative example is that localization policy considerations that do not meet the very classical characteristics of economic valuation, such as proximity to the world market, excellent universities with international reputation, high-tech research, could now be positioned and developed differently. Not economic factors of creative territory, intellectual capital of local governments, local urban knowledge could have a high influence on future policy of localization, if they are properly analyzed

1 Introduction

The Climate Change Convention sets general rules: a first step in structuring the debate was the establishment of the "Intergovernmental Panel on Climate Change" (IPCC). One of the most important developments is that this group has brought together many possibilities for discussion and action. On the other hand, controversies have also arisen, e.g.

a) The institutional structure: This has led to a predominance of technical/economic and scientific viewpoints in the development of opinions. The ability to communicate between working groups is described as "underdeveloped" (Conrad 2010).

b) Political structure: This leads to the need for extensive international coordination and thus often to "strongly agreed objectives". There are no sanctions against convention signatories that do not meet the targets (Eckhard 2010). In a global race for investors triggered by economic-political considerations, low corporate taxes and few additional business burdens (e.g. environmental regulations) are understandable from an economic policy perspective.

c) Social institutional/political perspectives in the climate change policy debate are still underrepresented (Conrad 2010).

The follow-up conferences to the Climate Convention ("COP") follow a very similar "ritual" in some respects. The assessment of the final documents is increasingly skeptical - COP27 in November 2022 in Egypt is a case in point (IPCC 2023, published in several national newspapers).

There is no doubt that there is still a lot of work to be done in the area of mitigation: technical measures to reduce greenhouse gas emissions, promoting reforestation, making energy use more efficient and ecologically cleaner. There is an almost endless amount of documentation on the measures implemented so far, usually descriptions of pilot projects that have produced good experiences in one place (e.g. Bogotá Summit, DIFU 2011, Pacto Climatco Mexico, in principle all National Progress Reports). These experiences are comparatively small in scope, with limited project funds, often outside the normal administrative structure, usually presented in descriptive terms. In this context, this area of information will not be dealt with further.

On the other hand, it has rarely been analysed and published: What were the **concrete initial conditions of such a project**? This question has several perspectives, e.g:

- with regard to **funding:** is it funding from a special governmental, national or local funding programme, are the projects comparatively small and limited in time?

- with regard to **institutional integration**: are the projects implemented by the state administration (national - regional - municipal) and thus integrated into overall development planning, or do the project promoters set up a kind of "parallel structure", and is civil society involved in preparation - implementation and evaluation?

- with regard to **territorial structures:** may they have been significant for its course?

To discuss possibilities to these questions, the **concept of governmentality** is used as a way to evaluate social-political action. Research has shown that it is possible to relate the general results of two different models of governmentality, which can be used to explain many negotiations on the implementation of

the Climate Change Convention in general (Oels 2010). On this basis, a concrete local example (Metropolitan District of Quito - DMQ) will be analysed. In the course of the comprehensive study on Social Innovation - Modernization of the DMQ (all works Gierhake and Jardón), it became clear that the model of governmentality can also be further developed with the geographical approach of researching innovation, determinants, actors, barriers and movement in the territory. Both theoretical concepts complement each other.

Thus, if it is hypothesized that the Local Climate Change Adaptation Strategy can be evaluated as part of a comprehensive modernization of the metropolitan district (social innovation), the following considerations are important.

a) What is the basic understanding of innovation processes - the "economic innovation" approach? Or the broader "social innovation" approach, whose decision-making structures in the "Global South" are predictably much more complex?

b) Have local knowledge, the characteristics of creative territories or existing networks for the diffusion of innovations also been analyzed in the territory in question?

c) Which known scientific concepts have been used that can explain the introduction and diffusion of innovations?

A step-by-step approach, in the sense of applied geography, a constant dialogue between existing theoretical explanations, practical experiences and possible mutual complements seems very appropriate. Moreover, this approach has already been successfully applied in numerous publications on the modernization process of the DMQ (all Gierhake / Jardón works).

It is important to note that, at the beginning of such an analysis process, it is not so much about the most up-to-date statistical figures or the exact sequence of legal or planning documents and their possible modifications over time. The focus should be on the essential structures that are important for managing such a process. These are plausibility's or contradictions in the legal or planning documents, but also in institutional responsibilities or capacities. This orientation also fits with a new global understanding of social innovation: bringing together known knowledge (institutions, their responsibilities, etc.) in a new context. In this case, deepening the impact analysis of municipal climate policy, especially with regard to social science and geographical knowledge.

2 Objectives

The general objective is to discuss how **complementary knowledge between Europe and Latin America** can be clarified and operationalized in the field of metropolitan development as a problem of globalisation with multi-sectoral characteristics. In order to achieve this, "A**pplied Geography**" is used as a method.

In view of the very broad spectrum of metropolitan development, a specific methodological perspective on the subject is necessary. In this context, on the one hand, it is a question of referring to the concept of "**governmentality**" in relation to climate change (Oels 2010). On the other hand, the results of the **process of comprehensive social innovation** in the DMQ (all works by Gierhake and Jardón) are used.

An individual case, municipal planning for climate change adaptation, integrated in the regional and national context, is presented. This takes into account that few empirical experiences have been analysed. In this context it is necessary to clarify:

- The aim is to demonstrate "if"/"how" theoretical concepts from Europe could help to analyse the progress and problems in the field of a local Climate Change Adaptation Strategy, or, how the remarkable developments in Quito could serve to streamline existing theoretical European based models. The focus is on an analytical - methodological perspective and possibilities for feedback on ongoing activities.

- It is **not intended to present a detailed description** of all important elements (administration, legal framework, political structure, partial projects). Details might have changed, e.g. the National Development plan, but the national framework is still important, can be evaluated ex-post. For future investigations, it will be a reference for reasons that helped or slowed down the process.

However, it is not intended to propagate a fundamental change in the perspective of analysis. National structures and mechanisms will remain important; the question is how local experience and knowledge can be better used (or how mistakes can be avoided). The aim is to introduce new points of discussion. On the basis of these local results, questions will be formulated that continue the dialogue "reality - need for research":

3 Theoretical framework and methods

The general aim of Applied Geography is that subject-specific knowledge should be used in a practice-oriented context. The exact objectives are set by society, not by academic institutions. Applied geography is most developed in the field of territorial planning.

The **basic assumption** is that territorial processes are basically shaped by political decision-making. Therefore, it is not possible to work with a certain exact scientific method (von Rohr, 1994), but **existing methodological knowledge must always be aligned with new questions** posed by society. The concept as such, the cause-effect relationships, does not change. However, due to the changing territorial and cultural context, modifications of the individual indicators are possible and even desirable. The process of debate between the theoretical concept and the practical issue, between civil society actors and academia, is continuous. When and how institutional actors address the issue are important milestones for the adaptation of an innovation (e.g. the local Climate Change Adaptation Strategy in Quito).

Questions of cross-sectoral research and practical relevance are repeatedly addressed. The current separation between science and society should be overcome as far as possible and the two fields should be better integrated. The evaluation of applied concepts to determine their strengths and weaknesses in the "Global South" requires considerations that influence the progress of research.

The first of these strategic considerations are general issues, in this context: a local approach to climate change adaptation and territorial development in metropolises, both of which are global problems due to globalization. On this basis, the concept of "governmentality" is analyzed, which examines five different levels on which governmental action manifests itself. The concept of governmentality was not developed specifically for climate change policy. However, it can be related to it (Oels 2010, adapting Foucault's original concept):
1) What are the objectives of a government (Who is the government? Who are the objects of government action?).

2) Where/how is government action made visible?

3) What technologies (instruments) are used?

4) What forms of knowledge are mainly used?

5) To which identity (self-image) are governmental practices directed?

This has already been discussed for two "governmentalities": that of "biopower" and that of "advanced liberal governance". If this relationship is established, results can be elaborated at the different levels of analysis, which can be discussed.

Basically, it can be observed that certain factors are only partially addressed. In this model, this is referred to as "invisibility" (Oels 2010). This discussion seems to make sense, as in this way the results are made accessible which have obviously led to the fact that the implementation of the "Climate Change Convention" has so far fallen short of expectations. In connection with the already published discussions, the following points should be noted:

What does the "biopower" model specify? In this interpretation of governance, the aim is to optimise the use of the forces/capacities of the population. Climate change is seen as a global problem, the local dimensions of this problem are largely ignored ("invisibilities"). The technologies used are mainly satellite images, international standards and regulations and computer simulations. The knowledge base is the natural sciences. The self-image is based on a subject acting rationally: "environmental managers acting globally" are supposed to control the problem.

What is the "advanced liberal governance" model? This approach wants to create markets also in the central organizational units of politics and administration. The market is seen as a guarantee against bureaucracy. Individuals and social actors have the quality of "entrepreneurs" in this sense. The instruments of the market represent: minimum performance indicators, competitive comparison between entrepreneurs, analysis of best experiences and their repeatability, reviews and contracting. The form of knowledge economy predominates. The self-conception is based on a rationally calculating entrepreneur. The approach is elaborated on a neo-liberal development strategy, based on the following

assumptions: (a) Through the annual publication of progress reports, States feel obliged to initiate programs that have a positive effect, as no one wants to be seen as a negative example. (b) Actors (governments) only make reasonable decisions. (c) The costs of climate protection can be presented as a win-win situation if climate protection measures are implemented in developing countries, as the costs are lower there; (d) Climate-damaging consumption/production patterns of industrialized countries are not to be questioned.

In summary, the two models of governmentality can be presented as follows

Variables of analysis	„Biopower“	„Advanced liberal governance "
Objective of government	Optimize the use of people's powers and capacities	Create new markets to replace the state bureaucracy. Introduce "market" as an organizing principle of government action.
Visibilities (reasons) Questions: What is produced? What problems need to be solved?	Market failures: Land as a complex system that can be scientifically controlled. **Invisible:** Local solutions, local knowledge in countries of the South, all social science knowledge.	Government failure: The costs of climate protection as a win-win situation **Invisible: developing countries bear the costs, consumption in industrialized countries as the major reason for climate change remains untouched, all social science knowledge**
Technologies Questions: What instruments, procedures and technologies are used to govern? Example: satellite imagery, computer models, etc.	“Security and surveillance" instruments: satellite imagery, computer simulations, global surveys Regulation: state-funded environmental management / "geo-engineering".	Market as an organizing principle: e.g. "Clean Development Mechanism" (procedure for global emissions trading). Negotiation technologies: treaties, contracting states' negotiations, cooperation partners: voluntary industry commitment, campaigns. Performance technologies: comparative surveys, regular progress reports.
Forms of knowledge Questions: What forms of knowledge are produced in the governance process and inform the process?	Natural and environmental sciences	Political science and political economy
Identities Questions: What self-images are people addressing through governance?	The human subject has his own self-interest and pursues it rationally	Calculate the entrepreneur in his own self-interest

Both concepts are based on a claim to general validity. The failure to take into account the essential political - economic - social aspects at the level of general objectives must therefore lead to deficits of analysis at the other explanatory levels of the model in both approaches.

Advanced liberal governance" assumes a failure of the state that can be corrected with market instruments. The "biopower" model is mainly based on the consideration that environmental problems show a "market failure". This is true, but it cannot be generally concluded that the complex "Earth and climate" system can be rationally controlled worldwide with scientific instruments.

The proposed technologies of both models of governmentality are based on the assumption of a global validity of the proposed solution concepts, which in general must be questioned. Local solutions (knowledge) thus disappear from the theoretical approach.

As far as the forms of knowledge are concerned, both models are based exclusively on a technical view. Within this specific professional view, the chain of argumentation is conclusive. The analysis of the self-understanding of the main actors is closely linked to the forms of knowledge and therefore also concentrates on particular perspectives. Within the given analytical concept, this is coherent, but conceals interpretation from other disciplines. This summary critical assessment refers to the specific views of the two models on governmentality, not to the analytical pattern.

4 Climate change adaptation in Ecuador

The analysis of the legal/administrative framework is made on the basis of national and regional planning and legal documents. The fundamental considerations are that local environmental planning cannot be implemented in isolation from the national (Ecuadorian) context, but also needs the support of regional activities in Latin America (Andean Community, international cooperation) to be effective. In this vertical perspective, from a low hierarchy of local planning to a high hierarchy at national or regional level, similarities (or contradictions) can be observed. However, with a cross-cutting issue such as "climate change", plausibility analysis is also necessary in a horizontal perspective, i.e. how climate change is included in the basic development documents of the study region (DMQ - Metropolitan District of Quito). The coherence of the objectives of general development planning, land use planning, economic development, etc. with the objectives of climate policy will favor its implementation. On this basis, statements on structural organization can be made.

4.1 The Latin American regional level

The CAN member states (Bolivia, Ecuador, Colombia and Peru) have developed and updated the Andean Environmental Strategy (CAN 2012). It includes "climate change" as an important sub-area. The overall objective is to coordinate national political programs and strategies on the subject, which will be achieved by supporting the development of national strategies, identifying possible synergies, creating strategic alliances and optimizing the means of international development cooperation. Climate change is one of the "axes" of the Andean Environmental Strategy, which is divided into seven fields of activity (CAN 2012).

There are several initiatives at the level of municipal networks. Two of them with a major regional scope will be presented: the Mexico Climate Pact and the "Bogota Summit" initiative.

The Mexico Climate Pact already has a worldwide membership of 286 municipalities. Of these, 42.3% (121) of the municipalities are in Latin America, of which 1/3 are in Mexico. Quito is one of the three Ecuadorian members (with Cuenca and the province of Pichincha). The objectives of the pact are: Voluntary reduction of climate-damaging gases, implementation of local mitigation measures, development of local adaptation strategies, documentation of agreed targets in a comprehensible way, promotion of direct access to international funding, establishment of the general secretariat in Mexico City, promotion of civil society participation in climate change actions, promotion of cooperation with multilateral institutions and national governments, promotion of city associations in climate change actions (Climate Pact Mexico) The "Bogota Summit" is a one-off event in 2012, the results of which can fit into both networks or deepen their actions. Conclusions with different depths were adopted, in detail:

1) Integrated spatial planning of settlements, cities and regions, on the one hand as an instrument for mitigation of the causes and on the other hand adaptation programs. 2) Mitigation and adaptation strategies at city level. 3) Urban transport management. 4) Integrated waste management. 5) Water as a cross-cutting issue for climate change projects. 6) Socio-spatial integration through climate change projects. 7) Improving the governance capacity of cities. Cooperation between local governments, businesses and citizens as determinants of local policies against climate change. 9) Developing tools and methods at local government level (Bogota Summit).

Regional knowledge sharing is thus a tool, but also a form of management. The first step is the creation of regional institutions, which could also function as an instrument for the exchange and dissemination of innovative ideas (Gierhake 2016, for the possible impacts of networks on the dissemination of social innovations).

4.2 The national level

Ecuador ratified the United Nations Framework Convention on Climate Change in 1994 and the Kyoto Protocol in 1999. With the "Decreto Ejecutivo 1815" of 1.1.2009, climate change mitigation and adaptation were declared policy objectives of the country, and the Ministry of Environment (MMA) was designated as the lead institution. With the same decree, all specific tasks at the national level were transferred to the "National Climate Committee" (CNC) (Coello Guevara / Morales Tremolada, 2010; Europe Aid 2009).

At the level of state administration, the issue is dealt with by two ministries: The Ministry of Electricity and Renewable Energy (MEER) and the Ministry of Environment (MAE). The "Decreto Ejecutivo 475" of 2007 is the basis for the creation of the Ministry of Electricity and Renewable Energy. This ministry was mandated to implement the energy supply transformation plan ("Change of the energy matrix and promotion of energy efficiency"). Within the MAE, the "Mitigation and Adaptation" departments are incorporated, a special administrative unit (department) on this topic is established, the national steering unit of the "Clean Development Mechanism" (Coello Guevara / Morales Tremolada, 2010; Europe Aid 2009).

With "Executive Decree 1815" (1 July 2009), mitigation and adaptation are defined as central policy areas of the State, and in October of the same year the "Sub-secretariat for Climate Change" was founded (Executive Decree 104). In the National Development Plan for the years 2013 - 2017, mitigation and adaptation measures are named as a means to reduce economic and ecological vulnerability (MMA b), thus integrating climate policy into an overall development context. The "Ministerial Agreement 095" of 19.7.2012 states that measures against climate change should be incorporated by provincial and municipal governments in their respective development and land-use plans. The proposal of this methodological approach is published as a basis for this (MMA b).

A National Climate Change Adaptation Strategy was presented in December 2012 (El Comercio 8.10.2012). There is a permanent monitoring centre for environmental policy ("Observatorio", Observatorio Político Ambiental), through which the progress of climate change related measures can be followed. It can be concluded that Ecuador has a favorable administrative legal basis for the elaboration of climate change policies.

The funding line of the United Nations Global Environment Facility (GEF) supports the preparation of the 4th Progress Report on the Implementation of the Climate Convention in Ecuador since 2019. This

project foresees two two-year plans (2019-20 and 2021-22). The project planning is set out as the main content. The following work areas emerge from it: Governance and Inclusive Government; Environment and Energy, UN Volunteers Program, Small Projects. The main projects planned for implementation are: Strengthening the reconstruction of natural disaster case of natural disaster as a measure of adaptation; Program reduced gas consumption, Reduced vulnerability in coastal cities of Ecuador and Chile, Increased resilience of people living in vulnerability situation, Planning the use of the soil in the Amazon to reduce emissions after the deforestation, Management of valuable landscapes and protected areas of high value, Energy Efficiency, Strengthening environmental management and Elaboration of the fourth progress report.

The biannual plans show progress compiled for COP 26 in Glasgow in 2021: the establishment of a large marine protected area between the Galapagos, Colombia, Panama and Costa Rica; the decided interest to participate in the global agreement to reduce methane emissions (minus 30% by 2030); the extension of Norwegian and German cooperation against deforestation, the signing of an international declaration of intent against global environmental problems by mobilizing investments to reduce emissions from deforestation and forest degradation (MMA, Alacorn 2022; Lopez / Zambrano 2021).

5 Adaptation to Climate Change in the Quito Metropolitan District

5.1 The process of developing a local Climate Change Adaptation Strategy

As a consequence of national objectives, Quito is **one of the first cities in Latin America** to adopt a local climate change strategy for the DMQ, and presented it internationally in 2010 (MDMQ 2010 - Municipality of Metropolitan Area Quito). The **overall objective** is the elaboration of **comprehensive policies on climate change** and its impacts, the **development of methods, instruments and management models, and applied research**, all with the participation of the main institutional stakeholders. The strategy is divided into four axes, eight programs assigned to them and 25 groups of activities.

- Axis 1: Structuring of information by the MDMQ (Programs: Research - Construction of an environmental information system, risk management and extreme climatic situations).

- Axis 2: Emission reduction measures (transport reduction program, promotion of alternative energies, mitigation - adaptation),

- Axis 3: Communication and participation (programs: public relations, training),

- Axis 4: Institutional promotion of the MDMQ (program: professional capacity building, MDMQ 2010).

Within the framework of the "Pact of Quito", the first conference of national mayors on climate change, the MDMQ presents ten areas of action on climate change: sustainable transport, integrated climate risk management, protection and management of natural heritage, network of urban green spaces, integrated water resource management, waste management, energy efficiency and alternative energies, consolidation of an environmental culture and promotion of sustainable environmental activities, awareness raising and knowledge creation on climate change, municipal environmental management (each broken down into individual measures, MDMQ 2011 a). With an "Ordenanza Metropolitana (Local

law decision)", this was legally established in 2011 as part of the municipal environmental policy (Consejo Metropolitano de Quito 2011). In other words, progress was made from an initial document to implementation stages.

The 2011 Strategy has updated the data and proposed an action plan. This action plan is divided into ten areas of adaptation and mitigation, each with three or four sub-areas. Specifically, these are: Sustainable mobility (e.g. Metro), Integrated climate risk management, Conservation (e.g. Development of a network of green spaces and urban parks), Integrated water resource management, Agriculture, Territorial planning and sustainable construction, Energy efficiency and alternative energies, Integrated waste management, Health.

5.2 Integration of the local strategy into municipal planning and territorial planning

The "Metropolitan Development Plan DMQ 2012 - 2022" (MDMQ 2012 a) is the basic steering instrument for local development; it is divided into five general objectives:

(1) Development process that puts people at the center,

(2) Development of the DMQ according to social and territorial functions, and priorizing public goods,

(3) integrated development in cultural, ecological, social and economic terms,

(4) comprehensive modernization in terms of technology and communication,

(5) democratic "territorial management", mobilization of social forces, participation and the exercise of civil rights.

With regard to adaptation to climate change, the following should be mentioned: Within the second objective, a cross-cutting "point-axial" land-use planning model is envisaged that includes the bordering areas of the province of Pichincha. Technology and local knowledge should promote the integration of environmental aspects into overall planning. Objective five contains sustainable environmental development, more specifically the protection and management of natural heritage and the improvement of environmental quality and adaptation to climate change.

In the Metropolitan Territorial Development Plan, all objectives are elaborated in a coherent way according to their territorial implications. The issue of "adaptation to climate change" is indirectly integrated in all parts, which also corresponds to the logic of such cross-sectoral planning. At the level of the "New territorial model for the DMQ", the following examples can be mentioned as examples

(1) Objective "Better use of territorial interdependencies": here the functions attributed to the center of Quito are: Innovation and competitiveness, knowledge exchange center.

(2) Objective "Implementation of national territorial development objectives", here with the activities: coordinated spatial development with surrounding municipalities, improvement of the transport system in the regional context, consensus on environmental objectives, and improved efficiency of municipal services.

(3) Objective: "Protected areas and ecological corridors", all planned activities are related to climate adaptation.

(4) Objective "Balanced urban-rural development", among others. The redefinition of urban and rural planning areas, the prioritization of mitigation measures for settlements in natural risk areas, alternative urban housing programs, a system of central locations for the provision of municipal services, densification of development in the centers and greater control of sprawl in the urban periphery (MDMQ 2012 b).

In summary, one of the seven objectives is directly related to climate change and environmental impacts. In four others, the issue can be mainstreamed and addressed indirectly. Climate change policy is clearly integrated into the overall development and territorial planning policy. This is in line with national objectives. Thus, the coherence of planning is both vertical and horizontal. The fact that climate change is directly and indirectly integrated into several development axes of municipal planning documents opens up another perspective for discussion: climate change as an instrument for coordinating sectoral policies at the micro level.

5.3 Proposal to adapt the existing model of governmentality

On the basis of the results mentioned above, the following proposal for existing governmentality in the DMQ can be drawn up:

Variables of the analysis	Climate Change Adaptation Strategy Quito
Government	The objectives are reflected in the National Development Plan, and are consistently formulated in the municipal reference documents. A "dignified life" (Buen Vivir) for the majority of the population, including climate-related objectives, such as the population's right to a clean environment.
Visibilities (reasons) What is produced? What problems need to be solved?	Climate change is seen as a global problem that requires local solutions, especially those corresponding to the problems of a metropolitan area. The metropolis is identified as a complex system that requires the integration of many actors (including civil society) and all sectors. The state is defined as a competent actor guiding development through the valorization of "public interests". Former Invisibilities (Chap. 3) are elaborated: local solutions and networking of solutions from the Global South.
Technologies What tools, procedures and technologies are used to govern?	Comprehensive planning: addressing well the scientific aspects (one of the four axes of the municipal strategy), but with new emphases: on institutional coordination (two axes), participation of the population and institutional development/formation of the municipality (one axis).
Forms of knowledge What forms of knowledge are produced in the governance process?	Research will be carried out in the municipality with an application orientation focus; research infrastructure has been established and is being used (Urban Research Institute, Ministry of Environment). The involvement of universities is possible (but not compulsory), inter-institutional cooperation, led by the MDMQ, is involved. Climate change is a tool in this process of strengthening global planning.
Identities What self-image do governance practices address?	The State (Municipality) as management unit that represents the interests of all, through a concept of “public interest”. It needs coordinate actions between all strategic actors, including municipality, national and international institutions.

6 Outcomes: The governmentality model and its relevance for climate change adaptation policy

At the **level of objectives, the climate change adaptation program developed by the MDMQ is clearly different from known models of governmentality**. In view of Ecuador's enormous political and economic crisis at the turn of the millennium, the clear separation from these models is understandable. On the other hand, the aim is to be able to control adaptation to climate change from a rational point of view. In contrast to the "biopower" approach, however, this new model is not limited to natural processes, and this is framed by a comprehensive National Development Plan that has elaborated administrative, political, social and economic aspects in equal measure.

On the level of "visibilities", precisely those aspects that were missing in previous models of governmentality ("invisibilities") are elaborated more precisely: the focus is on the local solution in the DMQ, but strictly incorporated in the specifications at national and regional level, i.e. Ecuador or the "Andean Community", but also in international city networks. The approach is based on local knowledge and integrates decidedly administrative social aspects. It requires the cooperation of many actors, and public concerns (and spaces) are strongly placed at the center. Thus, this approach has much more integrative aspects than "biopower" or "advanced liberal governance".

At the "technological" level, general development plans remain the guiding principle, so there is a proximity to the "biopower" model and its assumption of "market failure". However, in the case of DMQ, it is now not just a question of technical instruments of scientific controls (satellite imagery, etc.). These technologies are used, but integrated in an approach of institutional development, knowledge/capacity management between institutions, social and economic development.

The individual technologies are coordinated in a coherent way. The instruments are: Territorial planning - Sectoral plans - Monitoring procedures - Study of the attitudes of the affected population. The approach is very much focused on the "adaptation" aspect and the development of policy models. This is a coherent answer to the problems identified in relation to the obstacles to achieving the objectives of the Climate Change Convention: a strong focus on mitigation and a sectoral isolated policy approach. There are also concrete mitigation projects in the DMQ. They are set out in the so-called "Pacto Climático Quito" (Quito Climate Pact). An important focus is on the transport system of the DMQ.

The presence in international networks ("Pacto de México") and the high number of more institutionalised inter-national contacts make it possible to **speak of another (new) technology**: the structured exchange of information on administrative, planning and policy issues.

With regard to the "forms of knowledge" of the Quito climate adaptation model, it can be summarized: Implementation-related knowledge with a focus on socio-economic aspects is at the forefront of the model, although technical scientific knowledge (risk analysis, CDKN 2013, "ecological footprint", MDMQ 2011 b) is not excluded. From the problem set in the national progress report, sectoral knowledge and research, often led by international institutions, a coherent conclusion is drawn at the local level. This is comprehensive and territorially oriented knowledge. The concentration of this knowledge is closely linked to the policy-maker: the MDMQ. The already existing Urban Research Institute ("Instituto de la Ciudad") will be further developed in terms of organization and content. The MDMQ's environmental secretariat also produced a large number of professional studies.

The model of climate adaptation in the DMQ is based on a conception of governance (identity) in which the local government (representing the state) acts as an organizer and creates a very clear demarcation

from an economy-oriented governance model through the "promotion of public interests" approach. At the same time, society as a whole is addressed more strongly than before. This does not stop at the level of general planning, but is plausibly to be deepened at the level of "technologies". With the axes "participation of the population" and "training/learning at community level", a process is conceived in the municipal strategy in which the public is not only the object of a policy of its concerns. In the context of the "governmentality" model, this is a step towards the development of a new municipal political culture.

In short, Quito's municipal climate change adaptation proposal represents a substantially new model of governmentality.

7 Local adaptation to climate change as part of the social innovation „ Modernization Metropolitan District Quito".

Graph 1 shows the general structure of the social innovation "Comprehensive Modernization DMQ", the main determinants for the introduction of this process, important actors and foreseeable barriers to the diffusion process (Gierhake 2022, for details). The Local Climate Change Adaptation Strategy undoubtedly represents an important element of the comprehensive social innovation for the modernization of Quito. The Adaptation Strategy to Climate Change and is therefore the focus of the analysis (MDMQ 2010, 2011 a). The analysis has two orientations:

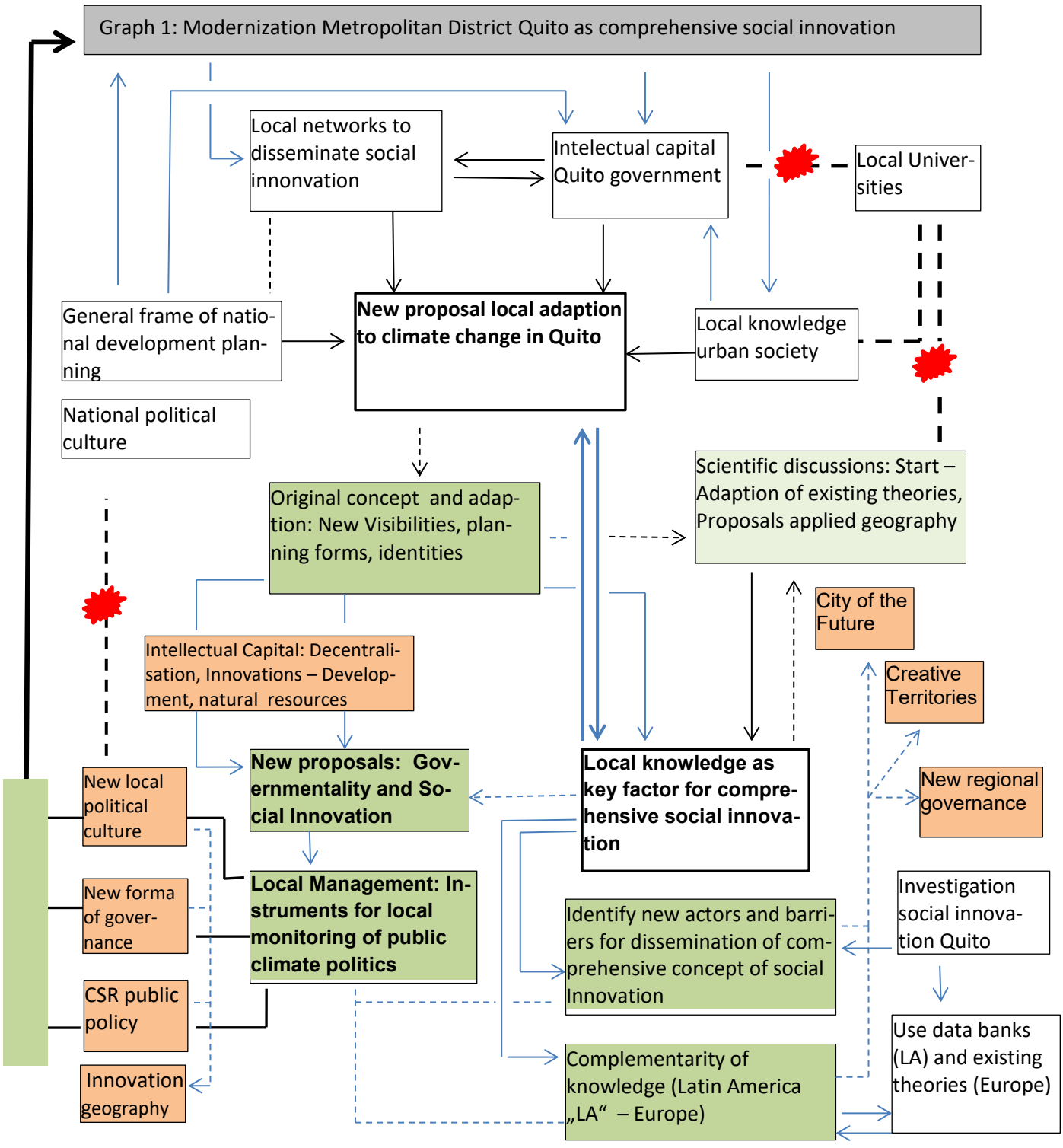
(a) This Adaptation Strategy was settled in the already identified territorial- institutional determinants for the social innovation process (Municipal Networks, Intellectual Capital, Local Knowledge, Creative Territories) and politically predetermined structures (framework of general development planning in Ecuador, universities as typical actors in innovation processes).

(b) This paper can in turn serve as a starting point for the further development of existing scientific concepts (here: Governmentality - integral social innovation in metropolitan areas).

The determinants for the social innovation process have already been analyzed in general (e.g. Gierhake 2022): the given national framework for general and topic-specific planning was elaborated in a coherent way (Consejo Metropolitano Quito 2011, MDMQ 2011 a / b, CDKN 2013), Quito actively participated in various national and international networks (MDMQ 2010, Gierhake 2016). Particularly in the area of natural resource management, an “area of knowledge” can be identified that obviously contributed strongly to the intellectual capital of the MDMQ (Gierhake 2022).

From there, the concepts already discussed with Quito social innovation can be presented: implementation-related (e.g. future city, new communal political culture, governance models) or scientifically oriented (e.g. geographic innovation processes, intellectual capital, creative territories).

If we now project the outcome, the Local Adaptation Strategy to Climate Change, onto the existing concept of governmentality and previous interpretations of climate change (left part of the graph), conceptually new results emerge: in a first step, it is about previously unknown visibilities, new forms of political participation and new political identities.


Graph 1: Modernization Metropolitan District Quito as comprehensive social innovation
Local networks to disseminate social innonvation
Intelectual capital Quito government
Local Univer-sities
General frame of natio-nal development plan-ning
New proposal local adaption to climate change in Quito
Local knowledge urban society
National political culture
Scientific discussions: Start – Adaption of existing theories, Proposals applied geography
Original concept and adap-tion: New Visibilities, plan-ning forms, identities
City of the Future
Intellectual Capital: Decentrali-sation, Innovations – Develop-ment, natural resources
Creative Territories
New local political culture
New proposals: Gov-ernmentality and So-cial Innovation
Local knowledge as key factor for compre-hensive social innova-tion
New regional governance
New forma of gover-nance
Local Management: In-struments for local monitoring of public climate politics
Identify new actors and barri-ers for dissemination of com-prehensive concept of social Innovation
Investigation social innova-tion Quito
CSR public policy
Use data banks (LA) and existing theories (Europe)
Innovation geography
Complementarity of knowledge (Latin America „LA“ – Europe)
Legend
Building blocks new knowledge
Different Intensity of interrelation
Barrieres
Building blocks Governmentality / social innovation
Forms of expression social innovation
weak connections, need of further investigation
Design of Graph: K. Gierhake

By combining expressions of the intellectual capital of local government, especially in the areas of decentralization, innovative development concepts, new resources and forms of use (Gierhake 2022), new perspectives can be found both for the concept of "governmentality and climate change adaptation" and for "social innovation". On the one hand, the **incorporation of territorial perspectives into the concept of governmentality** and, on the other hand, the **integration of aspects of political action into the concept of geographical innovation**.

This combination of the two theoretical tools of analysis would facilitate municipal management of adaptation to climate change. The indicators already existing in the two concepts (governmentality - social innovation DMQ) can form the basis for monitoring the impact of public policies in the environmental field. This, in turn, forms the basis for a further step of new links between existing knowledge (governmentality/social innovation) with:
a) Corporate Social Responsibility (CSR) approach to public policy (Bertelsmann Stiftung / GIZ 2007).
b) Design of the new local political culture approach (e.g. Gierhake / Jardón 2017a, Gierhake 2021) and
c) ultimately also with the original approach of geographic innovation processes (e.g. Gierhake 2016), since with a monitoring of the impact of municipal management on climate adaptation, indicators are also developed and implemented for the institutional- territorial dissemination of new proposals in the local climate change adaptation strategy.

This combination of existing knowledge from five different theoretical approaches, each related somehow to the sectoral policy „Local Adaptation to Climate Change", is in itself **a multi-level social innovation**. This represents a **remarkable potential** for further shaping and improving the overall approach "Social Innovation Quito". At the moment, it is not possible to determine exactly how this process could take place. Therefore, the field of social innovation is not labelled (green - left margin). It is foreseeable that here, from the local knowledge sphere, local universities will have an influence (top right margin of the graph).

In this diffusion process, a **major barrier** could be identified. This is the question of **political culture at the central government level**. Theoretically, the "Buen Vivir" (National Development Plan) approach should lead to a change in society as a whole (SENPLADES 2007, 2009). By the time wide movements of protest around the country appeared, for example, by the approval of the oil exploration in the Protected Area Yasuní (Pamela 2011, Loiza Lange 2017). Increased comments on the national government autocratic style and dishonest financial managers, who came to the general public with the first publications on the generalized practices of the Odebrecht corporation from late 2016 (several daily Ecuador) affected the credibility of the government. Another barrier in this context is located on the right side of the graph, the **lack of involvement of local universities in the dissemination process** at the local level (Gierhake / Jardón 2022).

The right side of the graph shows the perspective of conceptual scientific engagement with the topic of "local adaptation to climate change" from the perspective of governmentality and social innovation. The starting point is similar to the implementation oriented considerations. The clusters of factors determining social innovation in Quito have undoubtedly had a strong influence on the development of the strategy (intellectual capital in the MDMQ, local knowledge of society, activities of the MDMQ in various community networks). The **structuring of local knowledge** in the MDMQ has been a key factor for the

high conceptual quality of the strategy on local adaptation to climate change (MDMQ 2010, 2011 a/b; Gierhake 2022), and a fundamental factor in the development of a comprehensive concept of social innovation (Jardón / Gierhake 2020).

It can be summarized that barriers and important new actors have been identified in the process of diffusion of social innovation. The diffusion of notable sectoral policy developments, especially in the climate change adaptation strategy (MDMQ 2012), faces a barrier: lack of knowledge / only partially existing knowledge or very one-sided governmental approaches. This barrier is not insurmountable, at least in the initial period of innovation introduction. Universities are not an indispensable localisation factor, at least not for the introduction phase. A local government could take over this role (Gierhake / Jardón 2017). The local climate change adaptation strategy provides the starting point for identifying new actors. This has already been demonstrated for the role of universities in a general process of social innovation in Quito (Gierhake / Jardón 2021; 2022).

Overall, this is a gradually advancing process, in which initial publications and analysis of existing databases on ongoing projects in Latin America represent an important element (for a compilation of these databases, Gierhake / Vergara / Jardón 2021). At the same time, evidence of complementarity of knowledge between Latin America and Europe can be identified (with reference to the case of Quito, Gierhake 2021 and Gierhake 2023). The use of this knowledge could be a catalyst for the diffusion of social innovations. Their discussion with respect to existing theoretical concepts in Europe can continuously refine the level of complementary knowledge, positively influencing the diffusion process of social innovation. This is documented in the concepts of “City of the Future”, “Creative Territories” and new forms of “Regional Governance” initially at publication level (Gierhake 2023).

8 Conclusions

Criticisms that much more social science knowledge needs to be incorporated into the implementation of the Climate Change Convention are not new, as the summary of the last COP in Egypt show (e.g. Süddeutsche Zeitung, Umweltbundesamt).

There is no doubt that funding is a justified fundamental issue, but the implementation mechanisms have not yet been clarified, neither at the international level nor, even less so, at the various national levels. This analysis of the prospects for the implementation of the Convention shows:

Deficits can be identified in the current policy of implementation of the Convention. The prevailing conception of a vision of economic innovations, which puts the rationally acting actors at the center, whether from a scientific or an economic perspective, is reflected in the proposals to implement the convention. This is a misconception for an issue as complex as climate change adaptation. Social and environmental considerations have enormous implications. There are conceptual scientific approaches that can be used to better analyze the development of national climate adaptation policies (governmentality). It is worth mentioning that the institutional- territorial view of innovation geography allows for more dynamic moments to be introduced into the concept of governmentality.

Starting points for the development of interesting social innovations can also be realized. In order to introduce such an innovation, institutional actors are needed:

- On the left side of the graph, this would mainly be local government (new governmentality proposal, municipal management as a whole and climate policy management), where the competencies in general exist, and in the case of Quito 2009-14, also considerable capacities of implementation.

- On the right-hand side of the graph, which is more oriented towards concept development, institutions from different sectors come into consideration: civil society in general, research institutions (national and international), international development cooperation, and in the specific case of Quito also local government. The initial dissemination mechanism is also clear: discussion forums, publications, instruments of a new local political culture. However, there are no clear institutional competencies and therefore hardly any predefined ways of linking this new knowledge to other bearers of the innovation process. Possible actors would be local government, or universities, insofar as they are engaged in applied socio-political studies.

Despite the complexity of the problem of dynamic territorial change processes, existing scientific concepts can be adapted in a sensible way and better analysis of implementation steps lead to recommendations. There is consensus on the need for government-civil society consultation processes, which can now be structured on the basis of proven applied science results that are accessible to a wider public.

This does not necessarily require more extensive quantitative data, as is often demanded. Significant progress can also be made with qualitative data and their systematic classification, as this study shows. In this way, a problem often discussed at international conferences, the lack of quantitative data to initiate any consultation process can be overcome. This call for more data has become a barrier in the sense of the geography of innovation.

This vision of complementary knowledge made possible by an applied geography approach represents an important outcome, as climate change and territorial changes in metropolises are developing a growing momentum of their own, requiring institutional actors with the capacity to analyze and manage. This paper presents proposals.

A rather positive local example of climate change adaptation can also be presented: the local strategy of the Metropolitan District of Quito reveals a change in governance. This would be interesting for the scientific part of the analysis. In general, a basic objective of "social innovation" should be underlined; the composition of already existing “knowledge areas” (Gierhake 2022) in a new context can also lead to important innovations.

It is relatively easy at the level of introduction, little is known about the further stages of institutional and territorial dissemination.

This refers to the transfer of innovative concepts into planning actions, e.g. policy change. Socio-political barriers are likely to exist, especially in countries where political changes often represent complete changes of direction.

But it is also relevant for the level of accompanying research. There are few documented examples of multidisciplinary and applied research, both of which are underdeveloped in Latin American countries. Ecuador had introduced a suitable instrument to overcome this barrier in applied research outlined above with the "Programa Prometeo", the invitation to international postdoctoral researchers to conduct research on national development priorities. This paper shows how this type of research can be carried out and what results it can produce.

It is also worth mentioning that there are qualitatively new findings, e.g. with implications for a “local policy to develop the quality of localization factors” (Gierhake 2022). An illustrative example is that "location policy" considerations, which do not meet the very classical characteristics of economic valuation (no proximity to the world market, excellent universities with international reputation, high-tech research), could now be positioned and developed differently - on the basis of: socio-institutional factors of creative territories, urban local knowledge, intellectual capital of a local government.

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