

# Facilitation Processes and Skills Supporting EcoCity Development

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Ecocities can provide solutions for the improvement of human settlements around the world and the living conditions therein, but in the authors' experience, only as long as they are able to address the following questions correctly: How to formulate an ecocity concept that, considering issues of general concern, can be at the same time adapted to different local conditions? What are the instruments supporting the development and implementation of ecocity solutions? VTT's EcoCity concept for sustainable community and neighbourhood regeneration and development has been designed in response to the first question. Likewise, specific methodologies and effective facilitation processes and skills have been developed in response to the second question. Since the methodologies have been discussed in a previous scientific article, the present one focuses on the facilitation processes and skills, and also on other related, fundamental aspects like participation, adaptation, capacity building, etc. Facilitation processes supporting EcoCity development require matching "hard" and "soft" skills in a fluid way. The main findings are discussed with the help of two case studies: one in Medellín (Colombia), and the other one in Zambia.

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## Article

# Facilitation Processes and Skills Supporting EcoCity Development

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**Abstract:** Ecocities can provide solutions for the improvement of human settlements around the world and the living conditions therein, but in the authors' experience, only as long as they are able to address the following questions correctly: How to formulate an ecocity concept that, considering issues of general concern, can be at the same time adapted to different local conditions? What are the instruments supporting the development and implementation of ecocity solutions? VTT's EcoCity concept for sustainable community and neighbourhood regeneration and development has been designed in response to the first question. Likewise, specific methodologies and effective facilitation processes and skills have been developed in response to the second question. Since the methodologies have been discussed in a previous scientific article, the present one focuses on the facilitation processes and skills, and also on other related, fundamental aspects like participation, adaptation, capacity building, etc. Facilitation processes supporting EcoCity development require matching “hard” and “soft” skills in a fluid way. The main findings are discussed with the help of two case studies: one in Medellín (Colombia), and the other one in Zambia.

**Keywords:** EcoCity; EcoCity facilitation; capacity building; local adaptation; participation; sustainable urban development; Medellín; Zambia

## 1. Introduction

According to the recently adopted New Urban Agenda, the world's urban population is expected to double by 2050 [1] thus increasing even more the pressure on cities in relation to affordable housing, adequate infrastructures, public transport, employment, access to services, food security, environmental quality, etc. This poses enormous challenges for cities around the world, particularly those in developing and emerging countries. To make it even more complex, other equally important issues must be also considered like the rural-urban fringe, disaster risk management, biodiversity and ecosystem services, etc.

Ecocities can provide solutions for the improvement of human settlements around the world and the living conditions in those, but in the authors' experience, only as long as they are able to address the following questions correctly: How to formulate an ecocity concept that, considering issues of general concern, can be at the same time adapted to different local conditions? What are the instruments supporting the development and implementation of ecocity solutions? VTT's EcoCity concept for sustainable community and neighbourhood regeneration and development (discussed more in detail in Section 3) has been designed in response to the first question. Likewise, specific methodologies

and effective facilitation processes and skills have been developed in response to the second question. Since the methodologies have been discussed in a previous scientific article, the present one focuses on the facilitation processes and skills, and also on other related, fundamental aspects like participation, adaptation, capacity building, etc. It can be considered a follow-up article trying to contribute to the practical side of the ecocity debate. Consequently, this article purposely avoids engaging in a lengthy discussion on the theoretical aspects of ecocities (approaches, proponents, scope, etc.) since that would in itself provide material for a separate paper and it can distract from the focus intended. On the other hand, there is a large amount of literature on that topic. The intention in this case is rather to concentrate on aspects contributing to the successful implementation of ecocities in practice that however are typically overlooked, like for example facilitation. Finally, this article purposely tries to inscribe the scientific aspects in the real socio-political context where the urban decisions are being made.

To avoid possible confusion it is necessary to clarify that in this article “EcoCity” refers to VTT’s own developed concept and related activities, whereas “ecocity” or “ecocities” are used for the generic concept, activities and examples.

## 2. Research Aim, Methodology and Novelty of the Approach

The aim of the research presented here is to understand how adequate facilitation processes and skills can positively support EcoCity activities worldwide and thus contribute to sustainable community regeneration and development in varying local contexts. Facilitation is typically discussed alone in the existing literature; therefore the novelty of this approach lies in its evaluation in terms of its importance as a key factor for the success of EcoCity development which in practice has been corroborated by the authors’ experience. Likewise, the ecocity debate does not usually focus on the influence of facilitation, so this is another novel aspect.

The methodology followed consists of establishing a link between the consolidated knowledge on facilitation with two case studies, one in Medellín (Colombia) and the other in Zambia, to illustrate its importance as means of engaging the community with making more sustainable choices at different scales (country, region, municipality, city, neighbourhood, etc). These cases are particularly illustrative not only of the different conditions in which this facilitation takes place but also of the degree of complexity that it must handle. As part of the methodology, facilitation is also linked with other fundamental aspects like capacity building or participation. The evidence presented with the help of these two case studies is also underpinned by similar EcoCity activities carried out in Egypt, Libya and Tanzania omitted here not to make this article too long.

The description of the case studies is preceded by a discussion on EcoCity solutions for developing countries (background) and on the instruments supporting EcoCity development among which is facilitation. This is followed by a more in detail exploration of facilitation processes and skills and then illustrated through the case studies. The results of those are analyzed in order to: (1) establish some categorization; (2) draw conclusions; and (3) monitor next steps. Finally, some general conclusions are formulated.

At this stage, it seems quite difficult to use quantitative indicators for measuring the impacts of facilitation alone in relation to EcoCity development. Perhaps qualitative indicators referred to crucial aspects like articulation, coherence, comprehensive approach to complex decision-making process, etc., should be considered instead. Ultimately, if the projects and solutions thus developed would lead to practical implementation, then of course quantitative indicators could be used to measure the results in terms of water consumption reduction, CO<sub>2</sub> emissions reduction, etc. However, even though this is obviously a desirable outcome, it was not the main aim of the case studies presented here and its achievement depends on, among other reasons, finding available sources of financing.

### 3. EcoCity Solutions for Developing Countries

For the sake of clarity and without entering into an ideological debate which would be outside the scope of this article, it should be pointed out that despite the criticism of the appropriateness of the term ‘developing country’, its use is still very widely spread and that is the main reason for keeping it here in the absence of a more accurate (and neutral) term that could replace it. Therefore, it does not imply the acceptance of any inferiority compared to the so called developed countries, much in the same way that United Nations uses the designations ‘developing’ and ‘developed’ for statistical convenience without any intention to make a judgement in relation to the stage of development reached by any particular country or region [2]. Taking a step further, in the 2016 edition of World Development Indicators (WDI), the World Bank [3] is no longer making the distinction between developing and developed countries since these terms have become less relevant, particularly taking into account the global focus of the Sustainable Development Goals (SDGs) [4].

#### 3.1. VTT EcoCity Concept

The EcoCity concept for sustainable community and neighbourhood regeneration and development associated to the case studies discussed in this article has been developed by VTT Technical Research Centre of Finland Ltd. to respond to the needs and challenges of developing countries in close collaboration with local partners and major stakeholders. Originally, VTT EcoCity concept was built on the experience and knowledge gathered through a number of previous projects, mostly Nordic and European in scope, completed with the insights gained more recently in other projects like EcoCity Miaofeng (China) [5], EcoGrad in St. Petersburg (Russia) [6], EcoDrive in Riihimäki (Finland) [7], or UN Gigiri in Nairobi (Kenya) [8]. The ecocity perspective that underlies VTT EcoCity concept goes beyond the strictly ecological associated to the original term coined by Richard Register [9] to include the more general approach provided by sustainable urban planning very much in the way summarized by Maclaren [10] as “*inter-generational equity, intra-generational equity, protection of the natural environment, minimal use of non-renewable resources, economic vitality and diversity, community self-reliance, individual wellbeing, and satisfaction of basic human needs*”. Even other more recent aspects like resilience and climate change as argued by Newman et al. [11] are considered together with an emphasis on the integration of “green” and “grey” agendas as mentioned throughout the text.

Rapid urbanization is creating enormous challenges particularly for developing countries, like climate change mitigation and adaptation, sustainable urban development, affordable housing, integrated planning and funding availability, capacity building, citizen empowerment and participation, gender issues . . . among others. As described by Huovila and Antuña [12], the approach taken by VTT EcoCity concept to address these challenges can be summarized as follows:

- Best combination of technologies and services (understood as “systems” supplying a public need) that form sustainable solutions providing the users and inhabitants a high quality of life and indoor and outdoor comfort.
- Applicable EcoCity solutions depend on local conditions and need to be customized to socioeconomic realities.
- There is not one solution that fits all, but a number of possibilities that need to be studied to find the right solution for each case.
- Requires knowledge of local culture and traditions, available materials and competent partners.

Within this approach, VTT EcoCity concept main components should be customized to meet the local needs and conditions based on:

- (1) Sustainable city planning
- (2) Citizen participation and empowerment
- (3) Sustainable urban infrastructure

- (4) Sustainable housing
- (5) Local businesses and employment around sustainable housing
- (6) Coordination
- (7) Pilot project/Case Studies

At this point it seems necessary to stress that there are multiple interpretations for each of these components. Sustainability is understood here not as an absolute, but rather as an agreement resulting from a negotiation process that stands on a series of basic non-negotiable principles which support all that can be negotiated and ultimately agreed.

The last two components, Coordination and Pilot project, are required to achieve its practical realization from an operational perspective. Coordination refers to the role typically played by VTT of gathering local stakeholders and facilitating their participation in the development of sustainable solutions adapted to the local conditions, as well as managing the Pilot project. In turn, a Pilot project is needed to provide the specific context and boundaries for which EcoCity solutions should be proposed.

When moving from the conceptual and operational framework provided by VTT EcoCity concept to its practical application in a number of EcoCity projects and related activities worldwide, including workshops, seminars, trainings, etc., the issues of concern shown in Figure 1 have been consistently and repeatedly chosen by local partners, stakeholders and even citizens as unavoidable aspects to be carefully planned when pursuing sustainable urbanization. As can be seen, most of them can be related to one or several SDGs: SDG-2/Zero hunger, SDG-3/Good health and wellbeing, SDG-6/Clean water and sanitation, SDG-7/Affordable clean energy, SDG-8/Decent work and economic growth, SDG-11/Sustainable cities and communities, SDG-13/Climate action, etc.



**Figure 1.** Aspects of sustainable urbanization resulting from the discussions held within EcoCity projects and related activities presented simply in alphabetical order from left to right and from top to bottom (Huovila & Antuña, 2012).

Certainly, these aspects are not only inter-related but have, in addition, numerous ramifications and links to other important topics like poverty alleviation, health, social cohesion, equality, awareness, participation, etc. However, while being systematically chosen as key issues of concern regarding sustainable urbanization, a strong need for local adaptation has been identified as absolutely necessary for the success of the EcoCity solutions developed. The reason is mainly that, even though the importance of these aspects has been corroborated in all cases, their manifestation, specific characteristics, degree of importance and, as a consequence, different management options are particular to each case. And this is what constitutes the basis for adaptation to local conditions.

Moreover, this local adaptation is one of the key pillars of a win-win situation where the solutions developed improve the performance of the case studies while the EcoCity concept is enriched and

strengthened, not only in relation to its content and specific methodologies but also in terms of participation and facilitation. As an example, through the Medellín case study (described more in detail ahead) and the collaboration with the local partners and stakeholders, BIODIVERSITY and ECOSYSTEM SERVICES were incorporated to the abovementioned aspects and therefore discussed and applied in subsequent case studies and EcoCity activities. The idea is to engage in a sort of “continuous improvement feedback loop”.

### 3.2. Adaptation to Local Conditions

It seems necessary to stress that the EcoCity concept discussed here was formulated in Finland, a Nordic country that normally scores very high in different international indexes (e.g., Good Country Index, and also with regards to education, wellbeing, equality, good governance and very low corruption, etc.). In addition, Finland has a long tradition of promoting sustainable development both nationally and internationally. The Finnish National Commission on Sustainable Development (FNCSO) was established in 1993, only one year after the 1992 Rio Conference. Since then Finland has implemented various programmes and strategies, the latest of which, “The Finland we want 2050-Society’s Commitment to Sustainable Development”, was adopted in 2013 and updated in 2016 in line with the UN 2030 Agenda for Sustainable Development [13]. From the beginning, Finland has taken a holistic approach towards sustainable development, aiming at an effective integration of economic, social and environmental aspects. To that end “sustainable development is perceived in terms of the wellbeing of people and the environment, a healthy and sustainable economy and the promotion of sustainable lifestyles” [14]. What comes to international development cooperation, Finland’s development policy has been outlined in the “Government Report on Development Policy” published in February 2016 and also aligned with the UN 2030 Agenda. Its main goal is to reduce poverty and inequality, with a special emphasis on the rights of women and girls and on promoting employment and wellbeing [15].

Furthermore, Finland has recently published the world’s first roadmap to a circular economy, outlining the steps towards sustainable success by decoupling economic growth and increased wellbeing from a wasteful use of natural resources [16]. However, precisely due to Finland’s traditional commitment to sustainable development, which constituted the background for the formulation of VTT EcoCity concept, there was certain risk of taking for granted issues of high concern for the target countries that are not explicitly included in the EcoCity’s definition of sustainable urbanization, environmental protection, etc. For instance, in most countries in Sub-Saharan Africa, around 80% of the population live in rural areas with no access to electricity [17]. In consequence, priority should be given to ENERGY ACCESS (rather than just ENERGY EFFICIENCY, one of the aspects shown in Figure 1). Therefore, collaboration with local partners and stakeholders, and adaptation to the specific context become crucial to achieve successful results. VTT’s experience working with different partners and stakeholders around the world in a number of EcoCity projects and activities clearly corroborates the importance of supporting communities to develop and implement their own definition of sustainability adapted to their local conditions very much in line with Roseland [18], and more recently with Wong & Yuen [19].

But what are those varying local conditions that require adaptation? Based on the experience presented here, they can be mainly categorized as socio-economic, socio-political, socio-ecological and cultural, more detailed ahead in Table 2.

## 4. Instruments Supporting EcoCity Development

At this point, some clarification regarding the terminology seems necessary to avoid possible confusion and misinterpretation. Instruments should be understood here as all means “used to pursue an aim” [20], the aim being in this case the development of localized EcoCity solutions. In this context, the term “instrument” provides a wider scope than “tool” which is typically used when referring to e.g., sustainability assessment tools, energy rating tools, etc.

As it will be discussed further ahead through the example of two case studies, experience from recent EcoCity projects and related activities, has clearly shown the need for the following instruments to support the development of EcoCity solutions that are adapted to the local conditions:

- specific methodologies,
- participation, communication and interaction,
- effective facilitation processes and skills.

Experience also corroborates the strong interconnection among the three. In addition to the previous, assessment and benchmarking, and consequently adequate indicators, and even tools, are also needed. And all this requires also local adaptation as it is being increasingly recognized [21] in order to respond to those issues that are at the top of the priority list of residents and policy makers in the developing world [22]. However, since indicators are such a broad topic, the discussion on possible EcoCity indicators and how to select, apply and monitor those will not be dealt with here. Likewise, exploring the tools available and their suitability to specific local contexts, particularly in developing countries, exceeds the purpose of this article.

#### 4.1. Methodologies

As presented by Antuña et al. [23], specific methodologies (understood as a set of practices) have been developed in close collaboration with local partners and major stakeholders in order to make sure that the measures, procedures, concepts and technological solutions proposed are adapted to the local conditions and support the generation of sustainable communities in developing and emerging countries. These methodologies have been applied for the first time in “EcoNBC, EcoCity Capacity Building in New Borg El Arab City (NBC)” [24], but since they have already been covered in detail in the abovementioned article, what follows is only a summarized description.

##### 4.1.1. EcoCity Roadmap

Adapted from Kazi and Wolf [25], this methodology for strategic forecasting and planning of future technology developments, comprises the following phases:

- (1) setting key priorities (vision),
- (2) developing thematic roadmaps and
- (3) identifying implementation actions.

In this case, the EcoCity roadmap was intended to be applicable for the whole of Egypt, even though it was developed through a series of multidisciplinary workshops having the particular situation of NBC in mind [26].

##### 4.1.2. EcoCity Feasibility Study (FS)

Through a series of structured workshops held in Finland and Egypt, a FS was carried out to evaluate in as much detail as possible the idea of turning NBC into an EcoCity [27]. And again, the group of participants in the workshops included practitioners and planners with a wide experience and knowledge of the local conditions and needs to be addressed, as well as experts from both countries. From the beginning, and for the sake of consistency, the FS was aligned and carried out in parallel to the EcoCity Roadmap for Egypt described before.

##### 4.1.3. Residents’ Energy Survey and Building Consumption Assessment

In order to select appropriate eco-friendly technologies, assessing people’s acceptance of those, creating operating manuals for certain products and enabling behavioural changes towards a low energy lifestyle, it is fundamental to understand the occupants’ energy behaviour. To that end, energy surveys are suitable means, particularly if direct measurement of energy consumption patterns is not



possible [28]. Since this was precisely the case in NBC, a specific survey was designed focusing on five main aspects:

- (1) seasonal domestic hot water usage,
- (2) natural ventilation mechanisms,
- (3) shading systems,
- (4) home appliances utilization (including lights) and
- (5) heating and cooling systems and related schedule.

#### 4.2. Participation, Communication and Interaction

As it has been mentioned, the VTT EcoCity concept is structured around the active and decisive participation of key stakeholders involved in the decision-making process related to one or several components of an ecocity. To this end and based on practical experience, both the participants and the participatory process must fulfil a series of requirements to guarantee the validity and governance of the results, especially bearing in mind that the EcoCity concept comprises a wide variety of possible components and, therefore, of potential participants.

In relation to the participants, in addition to their commitment and active participation, it is required that they are:

- Legitimated: they should have the explicitly delegated representation of the institutions or groups in which name they will participate and, if needed also make decisions. In the case of representatives of institutions and interested groups, legitimacy refers as well to their participation being representative of the interests and expectations of those and not their own.
- Informed: they should have enough information on the themes to be discussed, on the process itself, and on what is to be expected from it (scope, objectives, results) and from their specific participation. Reciprocally, they should contribute to the process and carry the information thus produced back to their institutions or groups.

With regards to the participatory process, it is required that it is:

- Transparent: the scope, objectives, and results expected should be clearly defined and agreed by the participants in order to avoid false expectations.
- Pertinent: it should allow and facilitate wide discussion on different topics related to ecocities but without losing the focus on the concrete topics included within the scope agreed. This is particularly important when considering the diversity topics that can come under the umbrella of sustainability and adaptation.
- Efficient and effective: it should adequately manage the time and resources available, as well as generate the expected results as agreed. To allow this, the participatory process should lie on a well prepared programme that enables moving from the initial stages of reflection and discussion to the formulation of conclusions, and ultimately to results, without setting too many constraints.

#### 4.3. Facilitation Processes and Skills

Even though the concrete facilitation processes followed to support the development of locally adapted EcoCity solutions will be described through two case studies, Medellín and Zambia, a more general perspective seems necessary at this point. VTT's experience in different EcoCity projects and activities shows that CAPACITY BUILDING of the local partner (or partners) is a key component to their success. Therefore, there is a strong link between capacity building and effective facilitation processes that can help the local partners and other important stakeholders, firstly in the definition of the problem and the identification of the needs to be prioritized, and secondly in developing solutions that will be accepted and integrated by the community [29].



Furthermore, at the root of these facilitation processes lies PARTICIPATION (see Section 4.2) and, in consequence, they are designed to enable participatory decision-making leading to a proposal for intervention. In turn, participatory decision-making stands on four core values according to Kaner et al.:

- (1) Full participation
- (2) Mutual understanding
- (3) Inclusive solutions
- (4) Shared responsibility

Meetings conducted in accordance with these participatory values produce significant results, namely stronger individuals, stronger groups and stronger agreements, along with many other derived benefits. Individuals and groups empowered in such manner will be better equipped to continue developing their own solutions in the future building on the improved skills and supportive atmosphere generated. Similarly, the agreements reached will include more and higher-quality ideas, wiser goals, as well as truly inclusive solutions [30].

From VTT's EcoCity perspective, this is precisely what capacity building is about. To achieve the abovementioned results, a solid expertise is required from the facilitator(s) who should master and integrate a number of listening skills or techniques to ensure participation as shown in Figure 2. In addition to the previous, in the case of EcoCity development, the facilitator(s) must have a strong technical expertise.



**Figure 2.** Facilitative skills for participatory decision-making. Own image based on content by Kaner et al. [30].

In short, facilitation processes supporting EcoCity development require matching “hard” and “soft” skills in a fluid way. In this case, there has been no conscious adherence to any particular facilitation school, even though some of VTT's experts involved had previous training and experience in group management and group dynamics. The journey has been rather a hands-on learning-by-doing one shared with local partners and stakeholders. Very much in the way Fierro points out, facilitating became a complex endeavour due to the diversity of the participants and the differing views and interests [31]. However, even though not consciously following any facilitation school in particular, when looking back to VTT's EcoCity facilitation experiences trying to draw some sort of parallelism, it seems that a couple of those were particularly close to the World Café process created by Juanita Brown [32]. One of them was VTT's EcoTanzania workshop within MUF2013 (Managing Urban Futures Workshop–Dar es Salaam, Tanzania) shown in Figure 3, and the other was precisely the Zambian case study presented in this article.

In fact, both workshops applied, even though unknowingly, World Café design principles:

- (1) Setting the context
- (2) Create hospitable space

- (3) Explore questions that matter
- (4) Encourage everyone's contribution
- (5) Connect diverse perspectives
- (6) Listen together for patterns and insights
- (7) Share collective discoveries

These were particularly important for MUF2013 where participants with different backgrounds from more than ten developing countries gathered to discuss and develop solutions for sustainable communities. Principles (1) and (3) were carefully considered during the preparation of the workshop in order to guarantee the maximum benefits for the participants, while the others were applied during its development.



**Figure 3.** EcoTanzania workshop within MUF2013 (Photo: Pekka Huovila).

Broadly speaking, in all VTT EcoCity projects the differences observed fall into one of these two categories:

- (1) Differences between the mindset and value set of the Finnish expert team as opposed to the mindset and value set of the local partners and stakeholders.
- (2) Internal differences among the local partners and stakeholders deriving from a number of circumstances like economic interests, varying degrees of formal power, existing local hierarchy system, political context, background and education, etc.

This in itself called for a special effort to unveil complexity instead of looking for easy ways to simplify the situation as recommended by Holman [33]. In practical terms, managing complexity means understanding the established dynamics according to which local partners and stakeholders usually interact, identifying the perceptions that lie under the reality described by the participants, making space for disruptive views and integrating them into the process ... And to that end, Fierro's self-reflective practice, as well as joint reflection together with co-facilitators, both from VTT and local, plays a fundamental role. In particular, the joint reflection with local co-facilitators strengthens the win-win situation mentioned in Section 3.1 where VTT experts can help the local counterparts by questioning certain concepts and practices that may have been taken for granted, thus enabling innovative solutions to arise. Likewise, the local co-facilitators and trusted partners, help VTT experts to understand the local context and power relations among the various stakeholders so that in turn they ensure better participation and inclusive solutions.

Medellín and Zambia case studies offer a very good example of all the previous, but also of creative tension and emotional tension as defined by Senge [34]. Both groups of participants strongly experienced the gap between the situation as it was and the situation as they would like it to be—*creative tension*, and in consequence felt the concern and frustration derived from that realization—*emotional tension*.

#### 4.4. Achieving Effective Knowledge Transfer

This is perhaps the ultimate goal, that the methodologies developed together with local actors supported by fluent communication and adequate facilitation processes in order to provide locally adapted EcoCity solutions will also contribute to an effective (and lasting) transfer of the knowledge. The capacity of the local actors thus built will enable them to continue developing EcoCity solutions by themselves. As an example, after the workshops held in Medellín (the results of which are mentioned more in detail ahead), the local stakeholders involved continued the work thus initiated which led to the formulation of a technical and economic proposal for the development phase of EcoMedellín project by Arví Park Corporation and EAFIT University. The EcoMedellín workshops enabled-through participation-the evolution from a public urban biodiversity policy to a specific project proposal that actually built on the conceptual basis established during the workshops. The project would address the urban fringe of Medellín as a social and natural habitat and its main case study would be the micro-watershed of La Honda Creek. However, considering its importance, knowledge transfer should be discussed more in depth in a separate article.

### 5. Facilitating EcoCity Development. Two Case Studies: Medellín and Zambia

The case studies presented here are different in many ways which helps to illustrate the wide spectrum covered by VTT EcoCities in terms of geographic boundaries, climatic conditions, social and cultural contexts, thematic and methodological outreach, etc. To start with they vary in scale: in Medellín the focus was on the city and the municipality, whereas in Zambia the focus was on the country as a whole. From a thematic point of view, they are also very different since Medellín focused on the rural-urban regeneration of a specific area called La Honda ravine, while Zambia focused on the country's sustainable development.

In relation to the stakeholders, in Medellín those formed a very heterogeneous group, while in Zambia the group was rather homogeneous since most belonged to Academia. Even from the timeline point of view, in Medellín pre- and post-workshop working sessions were carried out, whereas in Zambia none of these took place. There were also differences regarding the cultural background and mentality. The main point is that the case studies are not, and do not have to be, comparable and this is precisely the reason for choosing these particular ones. Therefore, there is a special emphasis on the differences as means to assess the validity of the framework proposed in its practical application to varying local circumstances worldwide. Table 1 summarizes those.

**Table 1.** Summarized description of Medellín and Zambia case studies. (Carmen Antuña, 2017).

	MEDELLÍN	ZAMBIA
Country	Colombia	Zambia
Scale	Urban, municipal	National
Theme	Urban-rural interface: the urban fringe as social and natural habitat	Sustainable development
Area defined	La Honda ravine	Whole country
Local partner(s)	Alexander von Humboldt Biological Resources Research Institute (National Research & Policy Institution) City of Medellín Environmental Department (Local Authority)	University of Zambia (UNZA)
Participants	Representatives of key agencies in relation to the case study, namely research institutions, regional environmental authorities and social agents (see Section 5.1)	Students from different Schools Faculty members

#### 5.1. Case Study 1: Medellín

##### 5.1.1. Description and Critical Analysis of the Local Conditions

The municipality of Medellín is located in the region known as the Aburrá valley, an interior valley of the central range of the Colombian Andes to the north-west of the country. The Aburrá valley

is an extremely biodiverse territory with great challenges for its conservation and sustainable urban development. In the Andean region urbanization has been an additional engine for the transformation of natural ecosystems, driven by growing industrialization and added to the social and armed conflict of the country, which has established the Colombian Andes and large cities as recipients of displaced population in search of better opportunities, generating unplanned processes of colonization on environmentally and socially fragile territories. 77% of the Colombian population is currently settled in the Andean region, and therefore it is the region of the country with the highest number of hectares transformed by urbanization.

The city of Medellín, located at 1450 MASL, is one of the great urban centres established in the central range of the Andes. It is the capital of the department of Antioquia and the most important city of the Aburrá valley, concentrating nearly 60% of the population of the department. According to Área Metropolitana Valle del Aburrá (AMVA), this results in less than 2% of Antioquia's territory generating an ecological footprint equivalent to 86% of the total area of the department [35].

Currently, Medellín is promoted as a compact city in the middle of the valley, where the river Aburrá is consolidated as a natural structuring axis, and where the management of protection zones and special areas should be strengthened. On the other hand, it is estimated that on the slopes of the Aburrá valley, 284,000 people are at risk of landslides. To the soil instability, the vulnerability of the settlements, mostly in informal and precarious conditions, must be added. Around 8% of the population of the Aburrá valley live in precarious conditions, that is, lacking at least one of the five conditions outlined by UN-Habitat: (1) durable housing of a permanent nature; (2) sufficient living space; (3) easy access to sufficient and good quality water; (4) access to adequate sanitation; and (5) security of tenure that prevents forced evictions.

Under these premises, the ravines (in about 57 micro-watersheds) directly affect the life of the hillside neighbourhoods and are the city's natural urban-rural connectors, offering an opportunity for the construction of a sustainable habitat and the social articulation of those neighbourhoods.

#### 5.1.2. Facilitation Aspects

VTT facilitation process in Medellín was part of an urban environmental management process that was being carried out by the municipal administration of the city with the collaboration of national, regional and local entities.

In 2012, the Municipality of Medellín through its Environmental Department, along with Explora Park Corporation, Medellín Botanical Garden Joaquín Antonio Uribe, the Antioquia Ornithology Society (SAO in Spanish), National Natural Parks and the Institute of Biological Resources Research Alexander von Humboldt (IAVH in Spanish), developed the basis for a policy of integrated management of biodiversity and ecosystem services for the municipality of Medellín. This process is known as “Medellín, a city for biodiversity” and basically this policy promotes the approach of integral management of biodiversity and its ecosystem services and defines criteria for biodiversity management to be included as an integral part of urban development strategies and, in general, applied to the territorial planning of Medellín.

In addition to generating the Management Policy, the applied research project led by the IAVH and the administration of Medellín identified needs, opportunities and priorities for intervention in the various landscapes that make up a rural-urban territory. These interventions are related to both biodiversity and ecosystem services—the “green” component, as well as housing and infrastructure—the “grey” component—in each of the landscapes, as summarized in the graph below (Figure 4).

It was concluded that the fringe represents a fundamental territory to regulate the use of biodiversity and ecosystem services as well as a scenario that demands innovation in relation to the regulatory, technological and social framework that traditionally prevails in urban management. Therefore, it was decided to develop a specific intervention project in the urban fringe of Medellín, which would allow incorporating the policy guidelines on biodiversity and ecosystem services in projects oriented to the comprehensive urban improvement of precarious developments.



**Figure 4.** Possible interventions related to both the “green” and the “grey” components (Graph: Juana Mariño).

Given that the framework project was almost exclusively oriented to the “green” component, it required the participation of an institution with wide and recognized experience in supporting and guiding participatory sustainable urban intervention processes. It was found that the EcoCity concept for the regeneration and sustainable development of communities and neighbourhoods developed by VTT comprised the elements required for the comprehensive urban improvement intended (see Section 3.1). The facilitation provided by VTT would complement the thematic components of the original project and strengthen the institutional and social components. The first part of VTT’s facilitation process in Medellín aimed at supporting the identification of the area of the urban fringe subject to priority intervention, as well as the definition-together with IAVH representatives and local institutions- of the components and scope of the comprehensive urban improvement project for the selected area (Figure 5).



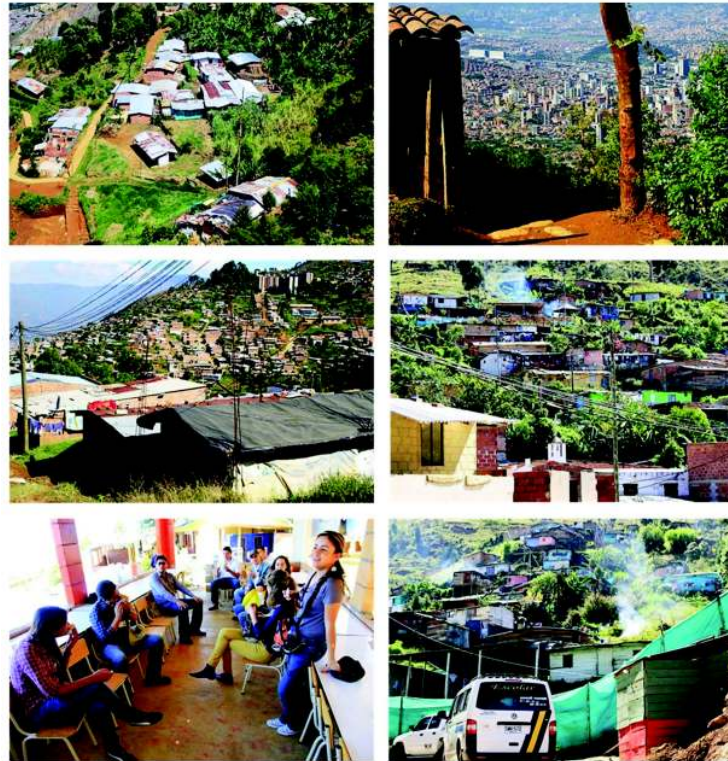
**Figure 5.** Various stakeholders select the area of intervention during the workshop in Medellín (Photo: Pekka Huovila).

#### Identification of the Area of Intervention

A joint analysis of the urban fringe was developed based on the priorities of the local administration materialized in regional projects such as the Central Park of Antioquia; urban-regional projects such as the Metropolitan Green Belt and the Bordes Project; and local ones such as the Proposal



for the Integral Management of Biodiversity and Ecosystem Services and the Habitat Strategic Plan. Once La Honda neighbourhood was identified as the potential case study area, a field visit was carried out (Figure 6).



**Figure 6.** Different views of La Honda neighbourhood taken during the identification trip (Photos: Pekka Huovila).

La Honda neighbourhood is located on the micro-watershed of La Honda ravine (Communes 3 and 4), West of Medellín, with the following general characteristics [36]:

- Social segregation
- Mobility difficulties
- Lack of public space
- High disaster risk
- 5000 dwellings planned for 2030

La Honda ravine starts at the top of the West slopes of Medellín and runs through the diverse urban landscapes of the city, from the Natural Park to the urban centre. The area of intervention covers the upper part of the micro-watershed, on the border between the urban area and the area of natural protection.

#### Definition of the Scope and Components of the Intervention

Once the area of intervention for the pilot project of integral urban improvement was agreed, VTT supported the process of defining the objectives, contents and scope of the project, as well as the terms of participation of the various stakeholders.

After conducting work meetings in Medellín and Bogotá with delegates from local and national institutions, it was concluded that the EcoMedellín project responded to priority action frameworks

from the Municipality of Medellín as the Territorial Planning Plan and the Development Plan Medellín a Home for Life 2012–2015 and the country as the National Policy for the Integral Management of Biodiversity and its Ecosystem Services and had a high potential for replicability in other Colombian and Latin American cities that share similar socio-economic circumstances.

Therefore, it was agreed to develop the EcoMedellín initiative with the characteristics shown in Figure 7. As can be seen, the main goal, components to be developed, agents to be involved, processes to be considered and instruments that would constitute the operational policy framework were enunciated and used for the development of a general description of the cooperation project intended according to the following aspects:

- Characterization of La Honda pilot project.
- Characterization of the actors (principal and others).
- Description of reference projects and their links to EcoMedellín initiative.
- Time horizon estimated for the project.

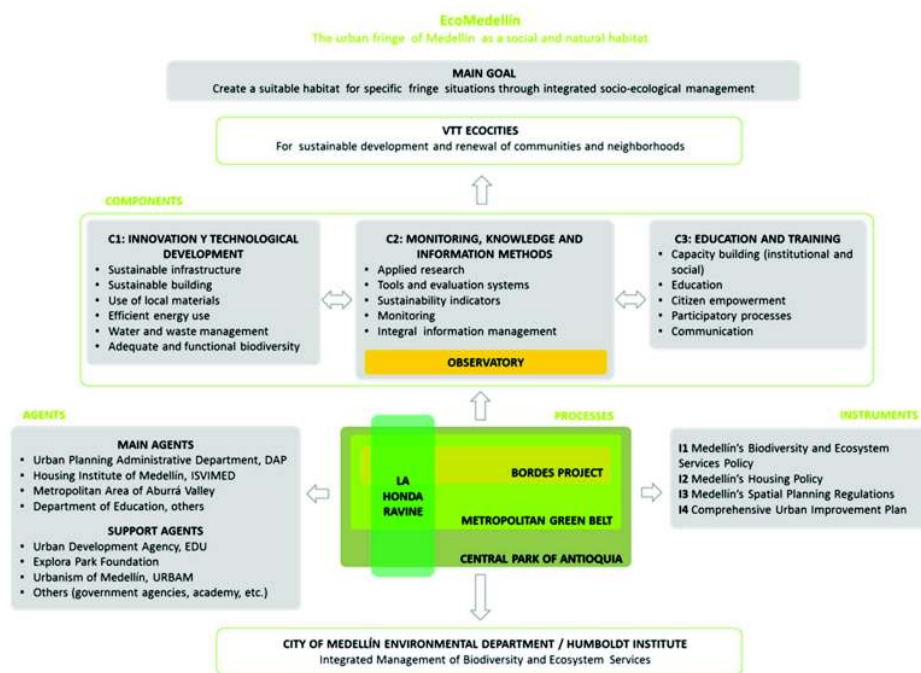
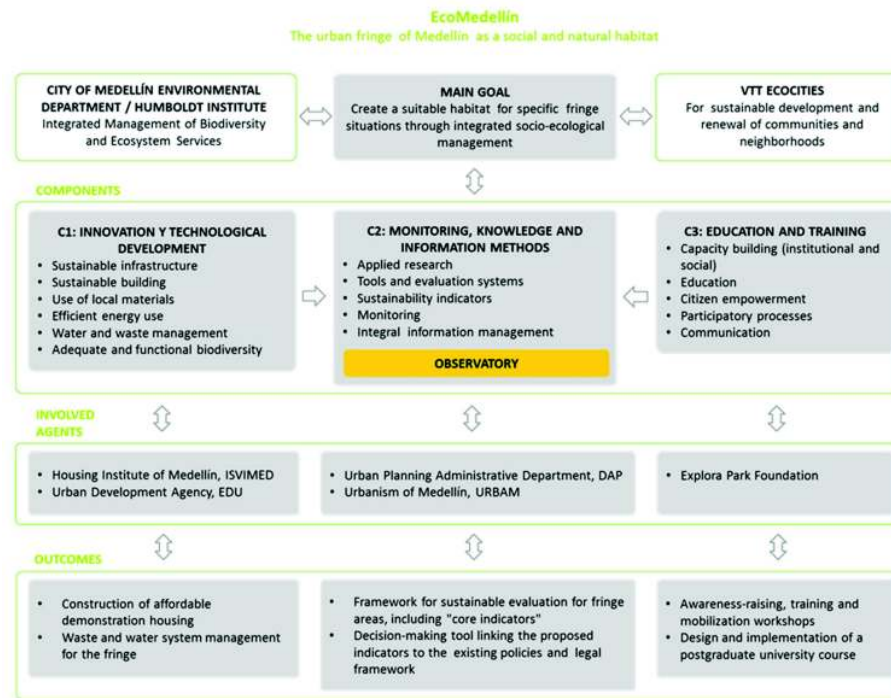


Figure 7. Cont.





**Figure 7.** Characteristics of EcoMedellín initiative (City of Medellín Environmental Department, Humboldt Institute, VTT Technical Research Centre of Finland Ltd.).

## 5.2. Case Study 2: Zambia

### 5.2.1. Description and Critical Analysis of the Local Conditions

The seminar and workshop “Creating a Sustainable Future for Zambia” was a dissemination action within “EcoLusaka. Sustainable education of the construction sector in Lusaka, Zambia” (2013–2015), a capacity building project funded by the Institutional Cooperation Instrument (ICI) under the Ministry for Foreign Affairs of Finland (MFA). During the project the Finnish partner, VTT, strengthened the capacity of the Zambian partner, Thorn Park Construction Training Centre (TPCTC) based in Lusaka, to provide education on sustainable construction and disseminate the results for wider use in the Zambian construction sector [29]. As a dissemination action, the main purpose of this seminar and workshop was to raise awareness among local stakeholders about the content, aims and results of EcoLusaka, as well as on key sustainability related issues. In addition, dissemination actions sought to enable an impact at a national level that might lead to a change in the Zambian construction regulatory framework towards a more sustainable construction process. In this particular case, it was decided to widen the scope beyond the construction sector and focus on sustainable development in order to engage students from different disciplines at The University of Zambia (UNZA). Therefore, it was organized like a two-day event with the ultimate goal of developing a vision for a sustainable Zambia. The event took place at UNZA on 20–21 May 2015 with thirty-one participants and it was facilitated by four VTT experts (one of them the manager of EcoLusaka project and leading author of this article).

Apart from a couple of faculty members, most of the participants were students from the following schools: Agricultural Sciences, Education, Engineering, Mines and Natural Sciences. This mix brought to the discussion a variety of viewpoints that contributed to enrich the vision developed.

### Creating a Sustainable Future for Zambia: the SEMINAR

The seminar was planned as a preparation to achieve the objective of the workshop of developing a vision for a sustainable Zambia. Therefore, after introducing the objectives of the seminar, VTT experts presented VTT's activities, and specially VTT's EcoCity concept and EcoLusaka as an example of EcoCity project. EcoLusaka helped the participants to bridge the gap between the EcoCity concept and its application to a particular context which they could easily relate to, and this led to a very fruitful discussion.

Finally, an introduction to sustainable development was made: definition, pillars, UN indicators, etc. At the end of the seminar, the participants were expected to be ready for addressing in a successful way the tasks of the workshop.

### Creating a Sustainable Future for Zambia: the WORKSHOP

As a first step towards a vision for a sustainable Zambia, the participants were asked to define the sustainability framework to be further developed in groups. Based on their own experience and knowledge, and also on the information presented and discussed during the seminar, the participants proposed a matrix formed by a set of key issues of concern and solutions for the problems associated with those as shown in Figure 8. Due to the urgency of the situation, the time horizon established was 5–10 years.

ISSUES OF CONCERN	SOLUTIONS			
	Policies & other tools	Education & Culture	Community	Technology
Waste				
Water & Sanitation				
Energy				
Transport				
Poverty				
Employment				
Informal settlements				
Health				
Lifestyle				
Pollution				
Biodiversity				
Land				
Food security				

Figure 8. Matrix representing the sustainability framework proposed by the participants.

The issues of concern selected were the following:

- Waste (solid and liquid, hazardous and non-hazardous)
- Water & Sanitation
- Energy
- Transport
- Poverty
- Employment
- Informal settlements
- Health (specially paying attention to HIV/AIDS, poor nutrition, maternal & infant mortality, poor medical provision, and inadequate health personnel)
- Lifestyle (specially paying attention to prostitution, alcohol/drug abuse, dressing codes, and crime)
- Pollution (considering water, air, noise and land)
- Biodiversity (formulated as “life for all living and support to all life”)
- Land

- Food Security

In principle, the methodology followed for the definition of a vision for a sustainable Zambia was the same one presented in detail in [23,27], and developed within the project “EcoNBC, EcoCity Capacity Building in New Borg El Arab City (NBC)” (2013–2015) [24]. However, compared to the issues of concern selected in EcoNBC project when defining an EcoCity vision for NBC, namely Energy, Water and Waste, in the Zambian case the issues of concern were more numerous. In addition to the issues of concern selected in the Egyptian case due to their enormous relevance from an environmental point of view combined with their importance in the local context, the Zambian participants wanted to include also some “social” issues of concern considered crucial for the Zambian context, like Poverty, Employment, Informal settlements, Health, Lifestyle, Land or Food Security. Interestingly, the Zambian participants also selected Biodiversity as a key issue of concern, as in Medellín case study, even though it was covered in a different manner.

To provide solutions for the needs identified in relation to the issues of concern selected, the participants proposed to structure those according to the following categories:

- Policies (strategies, laws, regulations) and other tools (e.g., related to revenue collection)
- Education & Culture (including attitudes, work culture, etc.)
- Community (including individual consumption choices)
- Technology

Again, if compared with the EcoCity vision for NBC, where the issues of concern selected were related to the sectors covered by the project (Residential, Commercial/Public Facilities, Industrial, Services/Utilities and Transport), the approach of the Zambian participants was also different. Interestingly, in the Zambian case Transport was not considered as a sector but as a key issue of concern. This comparison shows clearly how the same methodology is adapted in practice to varying local conditions. From a more general perspective, the framework developed in EcoNBC was very multidisciplinary but less holistic than in Zambia.

### 5.2.2. Facilitation Aspects

As explained, although the methodology followed was the same one used in the Egyptian case, it had to be adapted to a new environment. Given the number of participants and in order to be more efficient, the facilitators decided to divide them in four working groups and assign each group 3–4 issues of concern for which they had to propose solutions according to the categories listed above. These were the groups:

- Group 1—Waste, Water & Sanitation, Energy, Transport
- Group 2—Poverty, Employment, Informal settlements
- Group 3—Health, Lifestyle, Pollution
- Group 4—Biodiversity, Land, Food Security

To assist the work of the groups, a facilitator was always present in the group discussions. The facilitators rotated groups so that all of them could benefit from the different education, background and perspective introduced by the facilitators. The work in groups was preceded and followed by discussions involving the whole group for the purpose of defining the sustainability framework, sharing the results of each group and improving the vision together as shown in Figure 9.



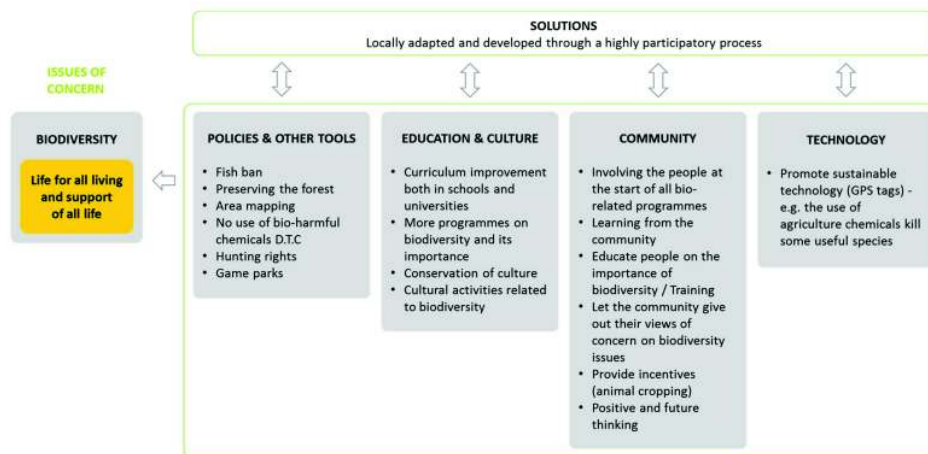
**Figure 9.** Discussions at UNZA during the seminar and workshop “Creating a Sustainable Future for Zambia” (Photo: Francesco Reda).

On a personal note, the participants in the workshop were so engaged that most of them refused to leave the classroom during the coffee breaks not to interrupt the ongoing discussions. Also, considering the quality of the interaction, it could be said following Bohm [37] that the participants were able to engage in true dialogue instead of discussion, as is common. A final discussion and assessment of the results was held at the end of the workshop with the participation of other professors and heads of several departments. The participants received a certificate of attendance.

## 6. Analysis of the Results

As already mentioned, the case studies presented here are not, and do not have to be, comparable. This is important since it is precisely through the differences that the validity of the framework proposed in its practical application to varying local circumstances worldwide is assessed. However, despite the many differences, when taking a closer look at the matrix representing the sustainability framework proposed by the participants in the Zambian case as shown in Table 2 and matching it against the Medellín case, it became clear that most of the issues of concern were also of extreme relevance for Medellín (the only ones that were not covered in Medellín’s case were “Health” and “Food security”, not because they were not found relevant but because they were not identified as a priority in this context).

Figure 10 partially shows the vision developed for Zambia for the sake of comparison with the Medellín initiative shown in Figure 7. Including the whole vision would make this article too long, therefore only the solutions proposed for Biodiversity, a key aspect incorporated after Medellín to VTT EcoCity concept as explained in Section 3.1, which was also found of great importance in the Zambian case.



**Figure 10.** Solutions proposed by the participants in relation to Biodiversity in their own words (Carmen Antuña, 2018).

Taking an even deeper look, it could be observed that those common issues of concern can somehow be considered as important aspects in relation to the variables associated to the varying local conditions that require adaptation. Because local adaptation is precisely what EcoCity facilitation has to ensure. On a general level, the adaptation needed is multiple: of the EcoCity concept itself; of the facilitation “style” so that it matches the local environment and makes the most of stakeholder participation; of the solutions proposed so that they respond adequately to the local conditions and are “owned” by their end-users.

**Table 2.** Varying local conditions requiring adaptation (Juana Mariño, 2017).

Type	Main Variable	Related Variables	Related Aspects
Socio-economic	Jobs Income level Quality of life (measured with adequate indicator sets) Education (formal and informal)	Education level Health conditions Skills and capacities Inclusion/Marginality/Social Stratification Vulnerability	Poverty Lifestyle Employment Health Food security Informal settlements
Socio-political	Policies and regulations Institutional structure and capacities	Legality/Formality of the dwelling Availability of social infrastructure Social welfare Governance	Waste Water & Sanitation Energy Transport Health Food security Informal settlements
Socio-ecological	Location Topography Climate Vegetation Density	Sustainability Risk (threats, vulnerability, resilience) Available materials and techniques	Pollution Biodiversity Land Food security Available materials and techniques
Cultural	Traditions Beliefs Knowledge systems	Openness Receptivity Engagement Relations/Leadership Resilience	Lifestyle Available materials and techniques
Degree, legitimacy and effectivity of participation; decision making and action			

On a more specific level, the adaptation can be categorized according to the following types: socio-economic, socio-political, socio-ecological and cultural as shown in Table 2.

As said, promoting participation is central to VTT’s EcoCity concept, but it should be stressed that experience has shown clearly that the local context affects highly the quality, validity and legitimacy of

the participatory process. For example, a participatory process involving the inhabitants of La Honda is very different from another one involving the authorities, or from a participatory process involving a diversity of stakeholders, etc. Therefore, as Table 2 shows, participation is strongly influenced by the numerous variables (main and related) linked to the types listed. Finally, in relation to gender, it could be noted that in both cases there was very good balance not only in terms of representativity but also in terms of decision making.

In both cases the visible result, which in the view of the authors can be considered a “success indicator”, was the identification and/or formulation of: (1) specific projects (case of Medellín) or (2) concrete solutions (case of Zambia), specially adapted to the local context in a participatory manner thanks to the framework provided by VTT EcoCity concept and facilitation. It could be argued that this is precisely what constitutes the best example of replicability, particularly taking into account the many differences between the two cases.

#### *Follow up and Further Development*

The second phase of VTT facilitation to the Medellín process corresponds to the formalization of the EcoMedellín project for the integral urban improvement of La Honda neighbourhood, within the framework of the previous agreement. In this new phase, the Centre of Urban and Environmental Studies (URBAM in Spanish) of the EAFIT University located in the city of Medellín, was linked to the process. This was done in order to effectively inscribe the socio-ecological and technological components in an integral urban planning project.

For this purpose, a formal association agreement was signed in fulfilment of which the signatories formulated a technical and economic proposal that encourages and shapes the project at an early stage, through the development of a comprehensive intervention model that addresses both biodiversity and technical and social aspects, as well as fundamental components to preserve and recover the ecosystem services associated with La Honda ravine, vital to guarantee adequate living conditions to the community established there.

In the Zambian case, the Head of the Department of Geography and Environment Studies expressed her interest in using the material developed during the workshop part for teaching. Also, based on the positive results achieved, several departments at UNZA indicated their interest in future collaboration with VTT, particularly around the topic of ecocities and sustainable urban planning and design.

## **7. Conclusions**

Considering the purpose, components, methodologies, etc. associated to VTT's EcoCity concept, capacity building is so much at its core that it would appear as if the whole EcoCity concept has been conceived and designed as a process to generate capacities since VTT's participation is only temporary and oriented to the transfer of the knowledge and the methodologies, and to facilitate the process for their effective application in accordance with local characteristics, needs and possibilities. Therefore, facilitation is very often combined with capacity building. VTT experts are not independent facilitators totally separated from the group they facilitate; they make presentations and are part of the discussions some times. Facilitation is thus the bridge between the general and the particular, it helps to find a common path transcending the management in silos (temporal, spatial, etc.). Facilitation also helps to keep the discussion within the jointly defined framework (threshold) of the non-negotiable and to prevent participation becoming an excuse to dilute the responsibility of those that should be held accountable.

As explained, adaptation is of special importance and VTT facilitation will support the EcoCity process through the development of solutions based on local traditions, specific social and economic realities, local perceptions and identity values, materials available and partners' skills and competences. Likewise, the solutions proposed will be the result of the best possible combination of technologies and services (from a sustainable building perspective) to guarantee a good quality of life for the inhabitants



of a specific territory, inside and outside the buildings. Ultimately, through its application in varying contexts worldwide, the EcoCity concept itself together with the facilitation processes and skills that support it become richer and therefore more useful when next applied in new situations. In conclusion, capacity building and adaptation happen both on the local side and on the side of the concept and its facilitators.

EcoMedellín project is part of a broader political, administrative and scientific process, as summarized above. In this process, the main contribution of VTT's EcoCity facilitation was related to two aspects of singular importance. On the one hand, it facilitated the articulation and complementarity between the technical "grey" components of sustainable urban development with the "green" components of biodiversity and ecosystem services-main object of the Framework Project. On the other hand, it facilitated the change of scale and perspective from a national and regional public policy project, to a local and specific project of direct intervention, supported by the methodologies and instruments provided by the EcoCity concept.

In addition, the change of scale and the expansion of themes meant the participation of new social actors, who benefited from the EcoCity experience and in turn generated new contributions "greening" the process of moving from a national project to a local (municipal) one, and a specific project in which the change of scale widened the group of participants, thematic areas of coverage, and the set of management tools. All this was made possible through VTT's EcoCity facilitation.

In Zambia, on the contrary, the facilitation helped the locals to move from the local to the national scale in order to create a vision for a sustainable future covering a number of issues of concern affecting the whole country. In this case, even though the participants were mostly students, the diversity of thematic areas of coverage was also ensured since they belonged to different faculties. Cultural diversity within the country was secured too since they were coming from different provinces.

In short, this EcoCity concept can be understood as a way to approach different realities in a complex but effective way, and must be supported by adequate facilitation in order to be successful. Comparatively speaking, an adequate facilitation can substantially contribute to move from land policies, urban policies, etc. to the definition of specific projects or the formulation of concrete solutions by achieving a high degree of participation and commitment of all stakeholders and interested parties, thus increasing the probability of appropriation of the project by the community.

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**Author Contributions:** Carmen Antuña-Rozado has been directly involved in both case studies described in this article. She was one of VTT EcoCity facilitators for EcoMedellín workshops and the manager of EcoLusaka project, of which the seminar and workshop "Creating a Sustainable Future for Zambia" was a dissemination action. Justo García-Navarro has coordinated the comparative study presented here, critically reviewed the manuscript and provided useful recommendations. Juana Mariño acted as the local coordinator and co-facilitator for EcoMedellín workshops.

**Conflicts of Interest:** The authors declare no conflict of interest.

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