CLEVER Solutions Basket

Connecting Measures of CLEVER to Business, Financing and Governance Models

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Author(s)	Marie-Christin Rische (HWWI)
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CONTACT:

Email: **info@clevercities.eu**
Website: **www.clevercities.eu**

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List of Abbreviations

BMC	Business Model Canvas
CAL	CLEVER Action Lab (project areas of the CLEVER Cities)
CSB	CLEVER Solutions Basket
FR cities	Front Runner Cities
HH	Hamburg
LND	London
ML	Milano
NbS	Nature-based Solutions

Executive summary

In the course of the CLEVER Cities project, the CLEVER Front Runner Cities implemented various measures to address the key urban regeneration challenges cities are facing. The CLEVER Solutions Basket describes and sums up all the applied measures in a structured way. Importantly, it outlines that the applied CLEVER solutions are not only measures like Nature-based Solutions as such, but also the business, governance and financing models which are necessary for a successful implementation and functioning of the (NbS) measures.

The CLEVER Solutions Basket is a table summarizing all information about the type of measures implemented, the challenges addressed and the business, governance and financing models applied. It can be found in the annex of the report. It is recommended to look at the table before or in parallel of reading the report.

The CLEVER solutions listed in the CLEVER Solutions Basket shall serve as orientation and inspiration for further and other measures developed by interested actors in the future. For individual measures, various forms of business, governance and financing models might be an option. The ones applied to the CLEVER measures are only one possible example which has been tested. However, it is helpful to consider certain underlying principles derived about the interlinkages of measures and models. By following these, tailor-made solutions for individual measures can be found.

In the main part of the report, first, the key urban regeneration challenges are described. Then the types of measures implemented in the CLEVER Cities project are presented. The next chapters then describe the business, financing and governance models used in detail. At the end of each section, bullet points outline the key messages which need to be considered when information from the CSB is applied. The last chapter then sums up some overarching conclusions derived in the previous chapters.

Introduction

The CLEVER Solutions Basket (CSB) is part of the Work Package 5 "CLEVER Solutions from Innovation to Market" of the CLEVER Cities project. It provides an overview and structures the (NbS) measures implemented in the project's Front Runner (FR) cities Hamburg, London and Milan from the perspective of business, financing and governance models. It is strongly based on the Report on Business, Financing and Governance models (D5.3) of the project which explains the underlying principles in a detailed way and builds the theoretical foundation of the CSB.

The term **CLEVER Solution** is referring to the purpose of the CLEVER Cities project to find solutions for the 4 key urban regeneration challenges (described in the next section). The core idea is to solve these problems by implementing so called Nature-based Solutions (NbS) which are inspired and supported by nature. However, not only the NbS as such are needed to address these challenges efficiently. In order to make the NbS work successfully also solutions for financing them, governing them and turning them into reasonable business applications have to be found. This is particularly important if NbS shall be replicated and upscaled broadly and outside of projects with public funding such as CLEVER Cities. Hence, within the CSB, the term CLEVER Solution also describes all kinds of solutions applied in the course of the CLEVER Cities project to finance and govern the NbS implemented and to turn them into successful business cases.

By summing up the measures implemented via pre-defined structures and categories, the CSB aims to inspire its users to choose solutions for their specific challenges and context in an easy and quick way. Details on specific measures and principles can then be found in related CLEVER deliverables like e.g. the Intervention Reports (D2.4) and the Report on Business, Financing and Governance models (D5.3).

The CSB is a structured overview in form of a table which can be found in the annex of the report. It will also be published on ICLEI's CitiesWithNature platform. This report describes all sections of the CSB table in detail and outlines interlinkages between them. Therefore, typical characteristics of the solutions in CLEVER are outlined as well. For further details on specific CLEVER measures and their implementation the Intervention Reports of the FR cities (D2.4) can be consulted.

1. Urban Regeneration Challenges

Societies face several severe challenges today. Due to rapid urbanisation, cities are under pressure to ensure the well-being of their rising number of inhabitants with limited resources such as space. The CLEVER Cities project aims to showcase how co-created NbS can help to address the so called 4 key urban regeneration challenges which have been identified in the EU H2020 call SCC-02-2017:

Figure 1 - Urban Reeneration Challenges

Human health and well-being: to reduce physical, psychological and physiological stress, damage and negative health impact (e.g. exposure to noise, air pollution, obesity, depression, morbidity, lacking sense of place, etc.)	**Sustainable economic prosperity:** to reduce high poverty rates, whilst boosting regional and local value chains by increasing access to job opportunities, and encouraging external investments and business start-ups.
Social cohesion and environmental justice: to enhance equal distribution and access to environmental qualities (particularly elderly and excluded social groups), strengthen community ties and decision-making processes.	**Citizen security:** to prevent insecurity and crime in public space, alongside economic instability, threat of environmental disasters (e.g. flooding) and social degradation.

Hence, the individual NbS measures implemented in the CLEVER FR cities aim to tackle at least one of these challenges.

In the CSB, the *Sustainable economic prosperity* challenge is expanded to "to reduce high poverty rates, whilst boosting regional and local value chains by **providing business opportunities**, **developing skills**, increasing access to job opportunities, and encouraging external investments and business start-ups." in order to consider the educational character of many of the applied CLEVER measures.

Key Points:

➢ Choosing a challenge which should be addressed is the starting point for working with the CSB and planning and designing measures. E.g. cities that want to implement (co-created) NbS should derive their concrete needs first and identify to which of the urban regeneration challenges these belong.

➢ Obviously, the urban regeneration challenges define how the measures should be designed. Each regeneration challenge typically requires to certain types of measures and certain types of benefits (described by the value proposition section). In the CLEVER Cities project, the *citizen security* challenge is e.g. mostly tackled by measures which improve rainwater management to protect citizens from damage induced by flooding since flooding is a common threat in the CLEVER FRs.

➢ The concrete choice of the measures and suitable models can be specified by looking further into the other sections of the CSB described in the following. Combining all this information hence helps to find tailor-made solutions for the urban regeneration challenges under specific contexts of each city (e.g. resource availability or governance possibilities).

2. Types of NBS and Activities Implemented

The measures implemented in the CLEVER FR cities can be broadly grouped into several categories. Some measures implemented focus on greening spaces (parks, gardens, walls, ...) whereas others are rather technical or infrastructure-related measures or are measures which are based on activities and programmes.

Key Points:

➢ The types of measures are strongly connected to the type of **urban regeneration challenge** which shall be addressed and determine the type of benefits which shall be generated. Yet, due to their multiple benefits, NbS measures often serve various purposes at the same time and hence offer solutions for multiple challenges. This is one of the key advantages of NbS. Combinations of solutions, e.g. gardens and (educational) activities, can increase the amount of benefits. The derived relations between sections of the CSB shall only serve as a broad guide for orientation. Individual measures might have divergent and particular benefits.

➢ A strong focus of the measures implemented in CLEVER lies on various forms of gardens and parks which are often combined with e.g. (educational) activities. Greening of roofs and walls is also applied in several forms. Moreover, a lot of CLEVER measures are combined with technical solutions like smart systems or grey infrastructure.

Figure 2 - Types of measures implemented in CLEVER

Typically Related Urban Regeneration Challenge	Type of Measures Implemented in CLEVER	Typically Related Type of Key Benefits/ Value Proposition
Human health and well-being	Wild meadows/forests	Biodiversity/habitat provision Microclimate (heat island)
Human health and well-being	Gardens/parks	Biodiversity/habitat provision Microclimate (heat island) Aesthetic value

		Space for social interaction/recreation
		Space for movement (play, sports)
Human health and well-being	Gardens with educational activities	Information/knowledge about NbS, health and/or environmental awareness
Human health and well-being	Playgrounds	Space for social interaction/recreation
		Space for movement (play, sports)
Citizen security Human health and well-being Sustainable economic prosperity	Green roofs/walls/streets	Biodiversity/habitat provision
		Energy efficiency of the building
		Microclimate (heat island)
		Aesthetic value
		Rainwater management
Citizen security Sustainable economic prosperity	Technical/infrastructure measures	Rainwater management
Social cohesion and environmental justice	Activities/programmes	Social interaction due to related activities
		Information/knowledge about NbS, health and/or environmental awareness

- ➢ Most of the measures implemented in the CLEVER Cities project are addressing the *human health and well-being* urban regeneration challenge since they improve *biodiversity/habitat provision*, offer a *space for social interaction/recreation or movement,* or increase *information/knowledge about NbS, health and/or environmental awareness*.

- ➢ Citizen security is mostly addressed by measures providing *rainwater management* benefits in CLEVER.

- ➢ *Social cohesion and environmental justice* is often addressed by measures which are based on or combined with activities and programmes.

> ➢ The urban regeneration challenge *Sustainable economic prosperity* is mostly covered indirectly by some CLEVER measures which offer skill development and hence foster job opportunities. If certain NbS like greening measures are upscaled and replicated, business opportunities for respective firms might arise.

3. Business Models

Thinking of and having an understanding of business models is an important prerequisite for deciding on and planning a concrete (NbS) measure. A business model outlines what value will be created by the measure, for whom, by whom and how. As described in the Report on Business, Financing and Governance models (D5.3), business models "may be viewed as a unit of analysis of NbS, describing connections between different cities' stakeholders and showing how they can create, deliver, and capture value (Osterwalder et al., 2014)". Hence, deriving a business model is the basis for summarizing the key benefits of a measure, identifying financing solutions or even promoting upscaling and replication. The detailed principles and the methodology for developing business models can be found in the Report on Business, Financing and Governance models (D5.3). There are several tools available for developing business models. For the CSB, the Business Model Canvas (BMC) created by Alex Osterwalder & Yves Pigneur was used as an orientation for collecting the relevant information to grasp the essence of the implemented measures and to summarize how they were applied (Osterwalder et al., 2010). Here, the three core aspects are **value creation**, **value delivery** and **value capture**.

3.1. Value Creation

Value creation describes what kind of value i.e. benefit the measure generates and for whom. In the CSB, value creation is represented by the sections **value propositions** and **beneficiaries**.[1]

Value proposition summarizes the key value that is created. Since NBS often offer various benefits at the same time this value proposition usually consists of a bundle of values. Importantly, these values do not have to be economic or need to be monetary but can also encompass any social or environmental benefit. Basically, everything which generally adds to the well-being of citizens and hence helps to address the urban regeneration challenges generates value. In order to condense the main purpose of the measures implemented, in the CSB the value proposition is narrowed to the key benefits the measure creates. However, it is important to note that most measures generate several additional co-benefits which might not be mentioned. For creating an easy overview, the values are grouped into a few categories of main

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[1] The Governance aspect which is a part of value creation in the BMC is an own section in the CSB.

benefits, such as e.g. *biodiversity/habitat provision* or *space for social interaction/recreation*, so that measures can easily be structured, compared and matched.

Figure 3 - Value propositions in the CSB

Typically Related Urban Regeneration Challenge	Value Proposition	Explanation
Human health and well-being	Biodiversity/habitat provision	Benefits related to diversity of ecosystems, living beings and vegetation by offering a /expanding living space for various (new) species and ensuring their survival/ well-being
Human health and well-being	Aesthetic value	Benefits related to the joy of perceiving "beautiful" things, spaces, views etc.
Human health and well-being	Microclimate (heat island)	Benefits related to (perceived) temperature reductions e.g. by shadows, less reflective surfaces ...
Sustainable economic prosperity	Energy efficiency of the building	Benefits to improved thermal insulation and other forms of energy saving measures
Citizen security Sustainable economic prosperity	Rainwater management	Benefits related to e.g. reduced flood risk, reduced sewage water, better filtered water, ...

Social cohesion and environmental justice Human health and well-being	Space for social interaction/recreation	Benefits related to social interaction and/or recreation by offering spaces to meet and/or rest or do leisure activities
Social cohesion and environmental justice	Social interaction due to related activities	Benefits created by bringing people together and creating social interaction
Human health and well-being	Space for movement (play, sports)	Benefits (health, joy) related to movement by offering spaces to do sports, play etc.
Human health and well-being	Information/knowledge about NbS, health and/or environmental awareness	Benefits related to expanding knowledge about e.g. healthy living, using the benefits of nature, environmental protection, ...
Sustainable economic prosperity Human health and well-being	Research and innovation	Benefits related to the research and innovation in new NbS or the improvement of existing NbS

Key Points:

➢ The value proposition should generally be closely aligned to the urban regeneration challenges since benefits shall help to solve these. In CLEVER Cities measures aimed at addressing challenges related to *citizen security* usually entail benefits related to the category *rainwater management* to mitigate potential flooding. While measures for *social cohesion and environmental justice* are often connected to benefits in the form of *space for social interaction/recreation* and/or of *social interaction due to related activities.*

➢ The value proposition of similar types of measures is generally similar as well. E.g., most kinds of gardens or parks simultaneously offer *space for social interaction/recreation*, *biodiversity/habitat provision* and/or *microclimate* benefits.

The CSB section **beneficiaries** describes who mainly benefits from the measures. Often, NbS provide benefits for the general public (e.g. in the form of biodiversity or habitat provision). However, a lot of (key) values might primarily benefit a certain group of people. These are often specifically targeted by the measures. For the CSB and the respective measures in CLEVER Cities the beneficiaries were grouped into the following categories:[2]

Figure 4 - Types of beneficiaries in the CSB

Beneficiaries

* Residents of the building(s)

* Residents of the street

* Local residents of the neighbourhood

* Pupils and teachers

* Scientists

* Artists

* Volunteers

Key Points:

➢ The identification of the main types of beneficiaries of a measure is crucial since financing options and governance models strongly depend on these. Obviously, people who benefit from measures are reasonable candidates to contribute to financing and governing them. Hence, the identified types of

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[2] For other contexts and measures, other categories of beneficiaries might apply.

beneficiaries closely influence the respective options for the sections financing models and governance models in the CSB.

3.2. Value Delivery

Value delivery describes how the value is delivered meaning what is required for the implementation (and functioning) of the measures. In the CSB, value delivery is represented by the sections **key partners** and **key resources** which outline who and what is needed to make the measures work. For the CSB, also the **investment size** is included as an additional section since this is commonly one of the most important pieces of information when deciding on a measure. In the BMC, this is usually subsumed under financial resources of the key resources part.

The categories for the **key partners** for the CSB are aligned with the categories of stakeholders used in the Intervention Reports (D2.4). Here again, it is useful to focus on the most relevant and essential ones:

Figure 5 - Types of key partners in the CSB

Key Partners:

* Governmental body

* Private Sector (landscape architects, designers, …)

* Non-governmental/ non- or for- profit entity

* Academia & educational institution

* Citizens

Key Points:

➢ The section key partners is usually strongly linked to the type of measure and beneficiaries. Certain measures offering e.g. *information/knowledge* benefits usually require partners from *academia & educational institutions*. Depending on the benefits generated, some groups of people might benefit from these. Naturally, these might be the ones initiating the measure or if not are possible candidates for involvement. Therefore, also governance models, hence governance arrangements and the level of citizen engagement, are often interlinked with key partners defined in the business model.

➢ For the measures of the CLEVER Cities project presented in the CSB, lots of different key partners are named. In many cases, they even vary for similar types of measures. This shows that there are generally many possibilities to involve different types of partners. For measures like gardens or parks, often *citizens* play a strong role. For the measures with educational elements, obviously *academia & educational institutions* are key partners. While in the case of the more "technical" solutions almost always the *private sector* is involved.

The section **key resources** describes what kind of resources are primarily required to implement (and maintain) the measure.

Figure 6 - Types of key resources of the CSB

Key Resources:

* Physical (manufacturing facilities, buildings, materials, …)

* Financial (if high amounts of costs occur/are the dominant issue, cash, lines of credit, …)

* Intellectual (expert knowledge for the more technical solutions, patents and copyrights, …)

* Human (teachers or other volunteers offering their time, …)

Key Points:

➢ The types of resources required are defined by the type of measure. E.g., a more technical measure might require relatively more *financial* resources while an activity might require mainly *human* resources.

In the CSB, the section **investment size** outlines the amount of financial resources required to implement the measure. Since actual costs vary depending on the context and only a rough orientation shall be given, investment size has also been grouped in categories ranged from micro to large as seen in figure 7.

Figure 7 - Investment size categories used in the CSB

Investment Size:

* Micro (0€ - 10.000€)

* Small (10.001€ - 50.000€)

* Medium (50.001€ - 100.000€)

* High (100.001€ - 250.000€)

* Large (>250.000€)

Ideally, a section for maintenance costs should also be featured in the CSB. However, for most measures in CLEVER Cities, this data is not available. Yet, maintenance costs might vary considerably between measures and are hence an important criterion to consider when choosing a measure. Moreover, it generally needs to be clarified how these are financed (in the long term) as well to keep measures working.

Key Points:

- ➢ The investment size is usually related to the key resources. If financial resources play a relatively dominant role, implementation costs might be high.

- ➢ Obviously, the investment size is also majorly dependent on the size and scale of the measure.

- ➢ The investment size might also influence the suitable financing model since certain types of investors might often be interested in a specific scale of investments.

3.3. Value Capture

In the CSB, value capture is represented by the sections **potential revenue streams** and **value capture**.[3] Here, it is described whether some value can be captured in the form of monetary streams by certain groups
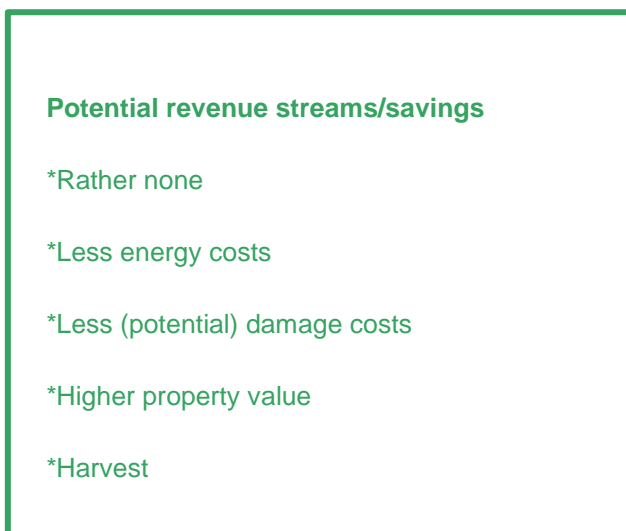
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[3] In this case, our CSB sections differ quite considerably from the BMC by Osterwalder & Pigneur.

of people. This is an important part of a business model since it determines options for the financing and also governance of measures.

The section **potential revenue streams** outlines whether the measure generates some kind of benefit in a monetary form, e.g. concrete revenues or savings. For example, some measures which entail food production could theoretically lead to revenues due to grocery sales or savings due to lower expenditures on groceries. Measures which increase energy efficiency usually also lead to expenditure savings which are hence a monetary benefit. Some measures might also increase property value/rents of respective or nearby properties to some extent. Unfortunately, most measures do not lead to direct monetary benefits. Especially social and environmental benefits, like e.g. biodiversity/habitat provision, do not directly lead to monetary gains (which is why investments in them are usually low).

Figure 8 – Potential revenue streams/savings in the CSB

Potential revenue streams/savings

*Rather none

*Less energy costs

*Less (potential) damage costs

*Higher property value

*Harvest

The section **value capture** of the CSB goes one step further and determines whether the potentially existent monetary benefits are captured exclusively by a specific group of people. Hence, whether the group of monetary beneficiaries is limited, meaning that benefits are "exclusive" and not captured by the general public. This is crucial since exclusive monetary benefits are one important incentive for private investments in measures according to economic theory. If (especially monetary) benefits are "public" meaning that everybody benefits, incentives for private actors to invest financial resources are usually low. In this case public financing is recommended since no private individual or company has a direct (monetary) incentive to invest. Individuals or companies might still have other motivations to invest into measures benefiting the public in some cases if they e.g. benefit indirectly through image/reputation improvements or if they gain utility from intrinsic motivation to do good for the public. In the same vein, there might be motivation to privately invest in non-monetary exclusive benefits. However, the combination of exclusive monetary benefits is the strongest case for incentive of private investment which is still quite rare for measures related

to NbS. Therefore, it is important to investigate if some of a measure's key benefits are monetary and exclusive. In the CSB, this is a *yes* or *no* category.
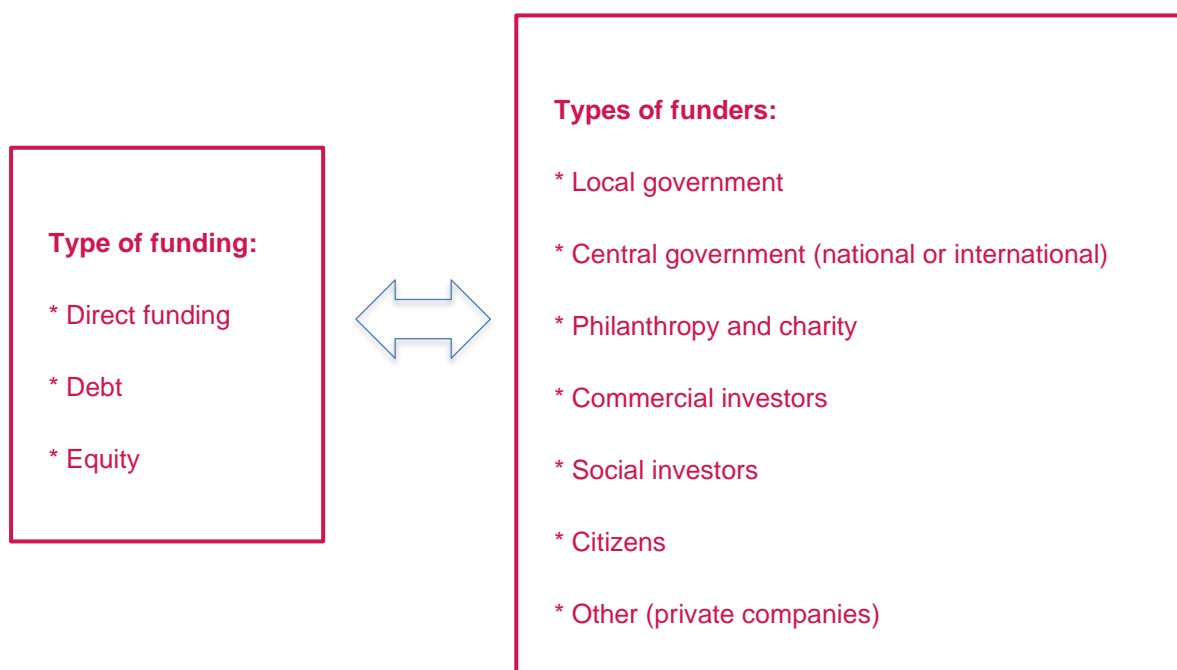
Key Points:

➢ Obviously, this section of the CSB is strongly linked to the beneficiaries and value proposition sections on the one hand and the financing models sections on the other hand.

➢ The section value capture is important for deriving financing options.

➢ Exclusive benefits (for certain groups of people) are a strong incentive for private investment by them. This incentive is particularly strong for monetary benefits.

➢ The meaningfulness of certain governance structures obviously also depends on the value capture as it makes sense to involve parties who capture the value.

➢ In CLEVER Cities, only very few measures offer potential monetary benefits in the form of e.g. revenues or savings. In some cases, these values are exclusively accessible to a certain group of people. These measures all belong to the categories green roofs/walls and technical measures and are in almost all cases implemented on private grounds which induces exclusivity. Also, in almost all cases some form of *other (private)* funding is at least partly involved.

➢ Some of the CLEVER measures offer (indirect) monetary benefits like e.g. though the harvest of fruit in the created fruit gardens. People who harvest theoretically might save on groceries. However, in most cases these are on public grounds, hence these values are not captured exclusively and cannot be transferred into an incentive for private financing.

➢ In some cases, measures which primarily benefit the public, are implemented on public ground and which are funded e.g. by local governments, could also generate (co-)benefits which can be captured by private agents. A good example in CLEVER Cities are projects which increase the liveability of the street or the neighbourhood (e.g. the greening of streets, playgrounds, community gardens). These are often linked to rather local benefits like aesthetic value, microclimate improvements or spaces for recreation. In some cases, this might come along with higher property values or rents of local private buildings which leads to monetary benefits of the owners exclusively. However, deriving these cases is difficult since effects are potentially small, very context dependent and hard to assign. Hence, in the CSB they are usually not indicated because they are too uncertain. Measures on private spaces/buildings, however, are assumed to offer these benefits to the respective property owners.

4. Financing Models

Measures based on NbS or connected to social benefits are commonly underrepresented in cities because they are difficult to finance due to their characteristics. As outlined in the Report on Business, Financing and Governance models (D5.3) perception of value does not necessarily translate into willingness to pay. Oftentimes, benefits are public and not exclusive and not obvious in form of direct monetary benefits. Hence, from an economic perspective only public funding seems suitable. Indeed, about 75 % of NbS are funded directly through public budgets according to the Naturvation Urban Nature Atlas (2020). Public funding is also the dominant source of funding in the CLEVER Cities project. In case of monetary benefits which can be captured by an exclusive group of people, incentives for private funding are highest. That is why the value capture section of the CSB is crucial for deriving possible financing options of a measure.

In the CSB, the **financing model** for measures is a combination of the type of funding and the type of funder. For both, options are based on the chapter on Financing NbS of the Report on Business, Financing and Governance models (D5.3):

Figure 9 - Funding models of the CSB

Type of funding:

* Direct funding

* Debt

* Equity

Types of funders:

* Local government

* Central government (national or international)

* Philanthropy and charity

* Commercial investors

* Social investors

* Citizens

* Other (private companies)

As highlighted by the report, measures with certain benefits are likely to be financed by certain funders. This is particularly true for benefits which are represented by monetary benefits as stated in the value capture section of the CSB.

Key Points:

➤ Certain types of benefits and especially potential revenue streams and value capture determine which types of funders and type of funding is worth considering.

➤ Usually, certain types of funders come along with certain types of funding (e.g. *direct funding* by *central government*).

➤ In CLEVER Cities, the most dominant forms are *direct funding* by *central government* and *direct funding* by *philanthropy and charity*. This is of course induced by the project itself, but also connected to the rather public types of benefits generated. Only few of the CLEVER Cities measures provide exclusive monetary benefits which can be captured by private agents. Hence, chances for private funding by *commercial investors*, *citizens* or *other* are generally low.

5. Governance Models

Governance models describe how measures are governed, especially with regard to involved stakeholders and the distribution of their roles. Due to their specific characteristics, for measures based on NbS or social elements like activities a multi-stakeholder approach which ideally involves citizens is usually useful.

As outlined in the Report on Business, Financing and Governance models (D5.3), governance models are quite complex, might vary a lot and should be adapted to the local context. There is no one-size-fits-all solution with regard to governance structures. However, the chosen models applied in CLEVER Cities can still serves as a point of orientation.

In the CSB, governance models are described by the sections **governance arrangements** and the **level of citizen engagement**. The section **governance arrangements** aims to briefly outline the role of governments. It is oriented on the spectrum of government and non-government roles in different governance arrangements developed in the project Green SURGE (Mattijssen et al., 2017) and also mentioned in the Report on Business, Financing and Governance models (D5.3). A measure can be *governance actor led* on the one extreme or *non-governance actor led/self-governed* on the other. In between, there exist various nuances of forms of government involvement.

The **level of citizen engagement** outlines the role which citizens play. On the one extreme, they might have *none* and/or might only be *informed* about measures, on the other extreme, they might be *empowered*

to create and govern the measures. Obviously, both sections are linked strongly and describe the level of co-creation.[4]

Figure 10 - Governance arrangements and degrees of citizen involvement of the CSB

Governance Arrangements:

* Government actor led

* Co-Management

* Co-Governance/co-production

* Non-government actor led

Level of Citizen Engagement:

* None

* Inform

* Consult

* Involve

* Collaborate

* Empower
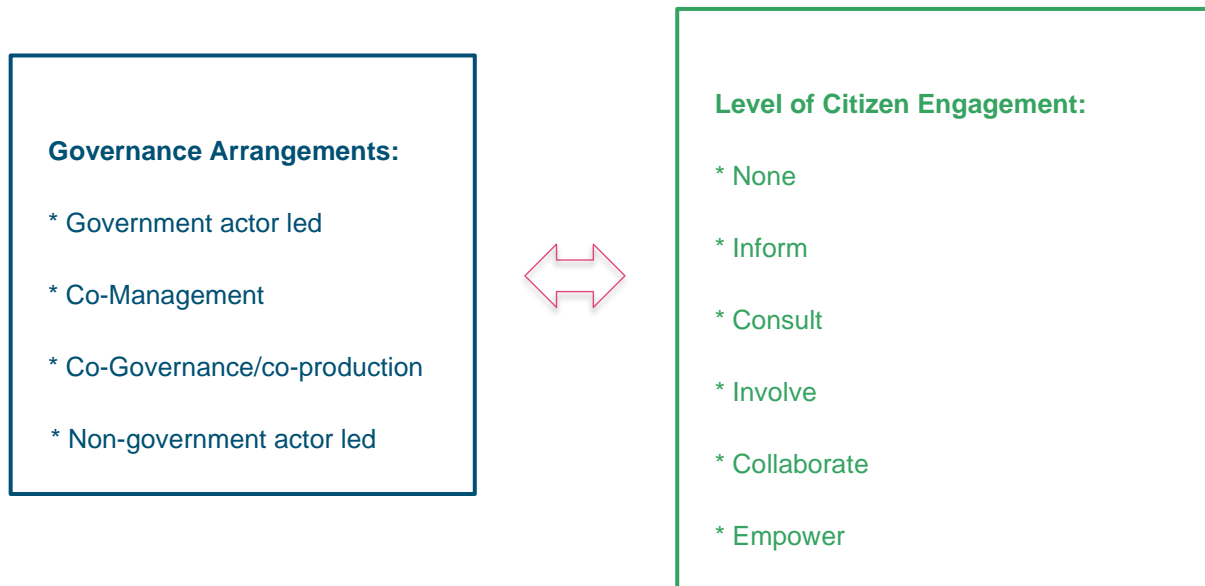
Key Points:

➢ The possible governance arrangements should be linked to beneficiaries as beneficiaries are suitable candidates for involvement.

➢ If measures provide exclusive monetary benefits to certain groups of people, it makes sense to involve them in the governance.

➢ In CLEVER Cities, there are some measures which are completely *non-government actor led.* Remarkably, the types of these measures vary from gardens and parks to more technical solutions*.*

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[4] We do not distinguish between different process stages like co-design, co-creation or co-implementation etc. here.

Hence, the types of benefits are diverse as well. In half of these cases, the level of citizen engagement is *inform* while in the other half citizens are more actively *involved* or *collaborate.*

➢ There are quite a lot of projects in CLEVER Cities which are *government actor led.* Indeed, a lot of the more technical measures which provide *rainwater management* improvements and are implemented on *public places* and *streets* are governed this way. Here, the level of citizen engagement is mostly very low. Not surprisingly, the measures are primarily funded through *direct funding* by *central or local government.*

➢ In fact, all "technical" measures are either *non-government actor led* or *government actor led* with very low levels of citizen engagement. This indicates that for these types of measures rather one-actor governance structures seem to be the norm.

➢ A wide range of different measures in CLEVER Cities is governed by a mix of *co-governance/co-production* or *co-management governance* arrangements with medium or high levels of citizen engagement.

➢ The highest level of citizen engagement (*empower)* is realized for measures like (educational) parks and gardens and activity focused measures. Here, it is obviously easier to involve them and benefits are also rather public.

6. Conclusion

The CSB demonstrates that there are lots of different measures to tackle various aspects of the urban regeneration challenges. They offer many different values and (co-)benefits which benefit various groups of people. With regards to suitable business, financing and governance models, which are needed to make them work, plenty of options exist as well.

The experience in CLEVER FR Cities shows the importance of the linkages between types of measures and hence benefits and business, governance and financing models. If measures related to NbS or social activities shall be implemented, upscaled, replicated or new ones shall be developed, the principles of business, financing and governance models need to be understood in order to ensure a successful outcome.

The CLEVER solutions listed in the CSB shall also serve as orientation and inspiration for further and other measures which might be developed in the future. For each measure, various forms of business, governance and financing models might be an option. The ones applied to the specific CLEVER measures are only one possible example which has been tested. However, it is helpful to consider certain underlying

principles about the interlinkages of measures and models derived in the CSB. By following these, tailor-made solutions for individual measures and their respective models can be found.

For certain types of challenges and hence measures with specific benefits, it might make sense to leave the implementation of according measures to public authorities. Biodiversity/habitat provision e.g. is a benefit which usually is public, hence basically affects everyone. Therefore, no private agents have the incentive to finance or manage measures which mainly provide non-exclusive benefits. Therefore, for certain measures, the financing and governance might need to be undertaken by public authorities still. However, the CSB shows that there are many cases in which measures related to NbS can benefit certain groups of beneficiaries which then have a motivation to engage in the design, implementation, governance and financing of these. For these measures it is crucial to arise awareness of business, financing and governance models, so that various actors understand the benefits and possibilities to apply these measures – so that their expansion can be ensured.

References

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Osterwalder, A., Y. Pigneur and C. Tucci (2010): Business Model Generation: A Handbook For Visionaries, Game Changers, and Challengers.

Annex: CLEVER Solutions Basket

Types of Measures

Measure					
"What was implemented"?					
CAL & City	**ID-N**	**Intervention Implemented**	**Type of NbS**	**Implementation Location/Level**	**Accompanying Activity**
Which CLEVER CAL (CLEVER Action Lab) belongs the measure to?	*ID of measure according to CLEVER D2.4*	*What kind of NBS was implemented?*	*Type of NbS according to CLEVER D2.4 and the POLIMI Guidance*	**Private building(s)* **Public building(s)* **Private space* **Public space/park* **Public street(s)*	*What potential activities took place? Here not the co-creation process is meant but whether the intervention is (linked to) a concrete activity.* **None* **Information campaign* **School lessons* **Workshops* ** ...*
Wild meadows/forests					
LND CAL 2	NBS5	Wild meadow (Rewilding Public Places)	WDS03 – Meadows; PUS15 – Urban Flower Fields	Public space/park	None
HH CAL 1	ID-N9	New Meadow orchard with early bloomers as ground cover	PUS Urban Flower Fields; WDS03_Meadows	Private space	planting activity together with the elementary school pupils; The activity was led by science teacher who in advance provided useful information about the early bloomers via school lessons
HH CAL 3	ID-N23	Turn your lawn into a flower meadow with an insect/ bug hotel	PUS15 Urban Flowers Fields, EHB07 – Hotel for Insects, BSI03 – Nano Gardens	Public space; Private space	Information campaign; Co-design of the space; Co-implementation on site with locals
LND CAL 3	NBS8	Tiny Forest (600 trees planted)	PUS12 – Arid Gardens; EHB08 – Facilities for Birds and Fauna	Public space/park	Volunteering
HH CAL 1	ID-N6	Insect hotel sculptures (by CLEVER initiated Makers' Club WerkHus)	EHB07 – Hotel for Insects/ bug hote; EHB01-Beehive Gardens; PUS15 Urban Flower fields	Public space	Workshops for establishing WerkHus as an entity; Co-design in the form of school lessons involving the pupils of the Gymnasium and co-implementation workshops;
HH CAL 1	ID-N8	Multigenerational bee-friendly shrub bed	EHB01 – Beehive Gardens	Private space	On-site planting workshop with expert guidance

Gardens/parks					
LND CAL 2	NBS4	Outdoor social space with raingarden, fruit trees, greening and outdoor furniture (The Terrace)	PUS04 – Shade provided by vegetation; PUS06 – Urban Fruit Trees; PUS09 – Eco-Urban Furniture; WDS03 – Infiltration Strips & Meadows; WDS14 – Rainwater	Public space/park	Play activities
LND CAL 1	NBS2	Edible Garden (with trampolines)	PUS 05 – Community Gardens	Public space/park	A programme of social events Gardening sessions Urban food growing Play activities
ML CAL 2	N.A.	Community garden (with green walls, fruit trees, butterfly garden)	BSI02 - Green Walls PUS05 - Community Gardens PUS06 - Urban Fruit Trees PUS15 - Urban Flowers Fields	Public space/park	Information campain; playing activites with pupils;
LND CAL 3	NBS10	Activision of a courtyard space for gardening and food production (Atrium Allotment)	PUS05 - Community Gardens	Public space/park	Gardening sessions Information campaign
HH CAL 1	ID-N3	Climate trees and benches	PUS04 - Shade Provided by Vegetation; PUS10 - Green Ventilation	Public space	Planting
HH CAL 1	ID-N5	Temporary gardens (at refugee accommodation)	PUS05 – Community Gardens	Public space	Workshops; Guided tours in Nature Santuary; Developing info booklets; activation events in the form of informal neighbourhood events; Planting and crafting activities for high beds and ochtagonal plateaus
HH CAL 2	ID-N19	Transformation of rainwater retention basin into public park	WDS10 – Rainwater Run-off Ponds, NRL07 – Peri-Urban Park	Private space	Workshops; Guided tour together with the planning companies and Hafen City University
Gardens with educational activities					
HH CAL 3	ID-N20	Researchers' garden for school	PUS05 – Community Gardens	Public space	Workshops and school lessons
HH CAL 3	ID-N22	Mobile School Garden	PUS14 – Raised Bed Vegetable Garden, PUS09 – Eco-Urban Furniture	Public space	School lessons; indoor design Workshops; Crafting the high beds in guided workshop; planting activity
LND CAL 3	NBS7	Learning Garden which includes a large blue green planter that will be connected to a smart weather system	PUS14 – Raised Bed (Vegetable) Garden; WDS14 – Rainwater Harvesting	Private space (school)	School lessons - focus on science and horticulture
LND CAL 3	NBS11	Green space development at school sites	PUS05 - Community Gardens	Public buildings	School lessons
LND CAL 3	NBS9	Outdoor Classrooms	Awareness Raising NbS	Public space/park	School lessons
HH CAL 3	ID-N21	Mobile Aquaponics system for school	BSI03 – Nano Gardens	Public space	Workshops; Co-Assesmbling the system in guided workshop School lessons
LND CAL 3	NBS12	Faith group green spaces	PUS05 - Community Gardens; NRL03 - Hedge Biotopes	Private Buildings; Public space/park	Volunteering
Play					
LND CAL 2	NBS6	Upgrade of play area for older children (new play equipment), new planting also (Nature Based Play)	PUS04 – Shade provided by vegetation; PUS09 – Eco-Urban Furniture	Public space/park	School lessons
HH CAL 1	ID-N10	Nature experience playground	PUS04 - Shade Provided by Vegetation; NRL07 – Peri-Urban Parks; EHB08 – Facilities for Birds and Fauna	Public space	Indoor workshops; On-site tour as a part of co-design workshop; Crafting with kindergarden pupils under guidance of the expert; workshops in the form of design element development for the fence; planting activity

Green roofs/walls/streets					
HH CAL 1	ID-N2	Bee-friendly qualification of an existing green roof	EHB01 – Beehive Gardens	Private building(s)	bilateral exchanges with the property owner and the expert groups e.g. Ministry for Environment, Climate, Energy and Agriculture
ML CAL 1	N.A.	Green roofs	BSI01 – Green Roofs, BSI03 – Nano Gardens	Private building(s)	Volunteering
ML CAL 1	N.A.	Rooftop multipurpose fruit gardens (on four towers)	BSI01 – Green Roofs (meadow/ green area); BSI05 – Urban Rooftop Farming; PUS06 – Urban Fruit Trees; PUS13 – Garden of Senses	Private building(s)	Volunteering
ML CAL 1	N.A.	Green wall	BSI02 – Green wall	Private building	None
HH CAL 2	ID-N12	Greening of noise barrier with diversified plants	TLI02 – Green Noise Barriers; EHB08 – Facilities for Birds and Fauna	Public space	planting actvitiy under the guidance of the gardener
HH CAL 2	ID-N13	Green façade with butterfly motif	BSI02 – Green Walls; BSI09 – Climate Façades; BSI10 – Living Walls	Private building(s)	information material; workshops; neighbourhood events; planting activity
ML CAL 3	N. A.	Greening of a new railway stop (green walls, trees, canopy…) plus smart water system	BSI02 – Green Walls; TLI02 – Green Noise Barriers; WDS14 – Rainwater Harvesting	Public buildings	None
LND CAL 1	NBS1	Healthy Streets	PUS02 – Tree-lined Streets; PUS03 – Car Parks with Green Areas; PUS04 – Shade Provided by Vegetation	Public street	None

Technical/infrastructure measures					
HH CAL 1	ID-N1	Connected root tunnel system/ 7 climate trees	PUS04 - Shade Provided by Vegetation; PUS10 - Green Ventilation Grids;	Public space	None
HH CAL 1	ID-N4	Connected tree pits and climate trees	PUS04 - Shade Provided by Vegetation; PUS10 - Green Ventilation Grids	Public space	None
HH CAL 2	ID-N16	Roadside Infiltration Planters	WDS01 – Gutters, WDS03 – Infiltration Strips and Meadows	Public street	Informational material/letters; questionnaires; citizen science offer through an APP
HH CAL 2	ID-N18	Smart Blue-Green Roof with Smart Flow Control App	N.A.	Private building(s)	None (multi-party meetings)
HH CAL 2	ID-N14	Blue roof technology as a drainage solution for inner urban paths	WDS04 – Porous Paving	Public street	None (multi-party meetings)
HH CAL 2	ID-N15	Drainage analysis tool for heavy rainfall	N.A.	N.A.	None (multi-party meetings)
LND CAL 1	NBS3	Nature-based Sustainable Drainage Sytems	WDS04 – Porous Paving; WDS05 – Water Ground Infiltration; WDS14 – Rainwater Harvesting	Private Building(s)	None
HH CAL 2	ID-N17	Retention space and earth dams in nature reserve	WDS03 – Infiltration Strips and Meadows	Public space	None

Activities/Programmes					
LND CAL 3	NBS13	Impelentation of a 5ft x 5ft vegetable patch (Allotment Residency)	PUS05 - Community Gardens	Private Building(s)	Practical gardening sessions
LND CAL 3	NBS14	Thamesmead Bloomin / Art Nature Thamesmead Home gardening promotion	BSI02 - Green Walls	Private Building(s); Public space	None
LND CAL 3	NBS15	Community Greening Activation Grant Programme (community led projects / workshops were developed bringing people into the green space)	N.A.	N.A.	Food and Seed from Scratch Thamesmead Wonder Walks Art Therapy Outdoor Workshops Nature Photo Workshops Dancing in the Park Virtual Tour of Community Gardens Brick - Thamesmead Texas Meditation & Awareness in the Park
HH CAL 1	ID-N7	Historic NBS-sign with insect hotel	EHB07 – Hotel for Insects, EHB01 – Beehive Gardens,	Public space	Concept design workshops; crafting workshops; content development for the info sign; insect hotel crafting etc. guided by expert (details in d2.4)
HH CAL 1	ID-N11	CLEVER Parcours guidance system	N.A.	Private space; Public space	Online and onsite workshops (cycle tours); neighbourhood event; info material production in the form of flyer, QR code, web-page inputs etc.

Business Models – Value Creation

			Measure				Business Models	
		"What was implemented"?				"Value Creation"		
CAL & City	ID-N	Intervention implemented	Urban Regeneration Challenge adressed				Value Propositions	Beneficiaries
Which CLEVER CAL belongs the measure to?	ID of measure	What kind of NBS was implemented?	*Human health and well-being:* to reduce physical, psychological and physiological stress, damage and negative health impact (e.g. exposure to noise, air pollution, obesity, depression, morbidity, lacking sense of place, etc.)	*Sustainable economic prosperity:* to reduce high poverty rates, whilst boosting regional and l ocal value chains by providing business opportunities, developing skills, increasing access to job opportunities, and encouraging external investments and business startups.	*Social cohesion and environmental justice:* to enhance equal distribution and access to environmental qualities (particularly elderly and excluded social groups), strengthen community ties and decision-making processes.	*Citizen security:* to prevent insecurity and crime in public space, alongside economic instability, threat of environmental disasters (e.g. flooding) and social degradation.	What type of main benefit/value is created by the intervention *Biodiversity/habitat provision *Energy efficiency of the building *Rainwater management *Space for social interaction/recreation *Space for movement (play, sports) *Microclimate (heat island) *Aesthetic value *Information/knowledge about NBS, health and/or environmental awareness *Social interaction due to related activities *Research and innovation	*Residents of the building(s) *Residents of the street *Local residents of the neighbourhood *Pupils and teachers *Scientists *Artists *Volunteers
Wild meadows/forests								
LND CAL 2	NBS5	Wild meadow (Rewilding Public Places)	X		X		Biodiversity/habitat provision; Aesthetic value	Local residents of the neighbourhood
HH CAL 1	ID-N9	New Meadow orchard with early bloomers as ground cover	X		X		Microclimate; Biodiversity/habitat provision; Aesthetic value	Local residents of the neighbourhood; Pupils and teachers
HH CAL 3	ID-N23	Turn your lawn into a flower meadow with an insect/ bug hotel	X		X		Biodiversity/habitat provision; Information/knowledge about NBS, health and/or environmental awareness	Local residents; pupils and teachers
LND CAL 3	NBS8	Tiny Forest (600 trees planted)	X	X	X		Biodiversity/habitat provision; Information/knowledge about NBS, health and/or environmental awareness	Local residents of the neighbourhood; Pupils and teachers; Volunteers
HH CAL 1	ID-N6	Insect hotel sculptures (by CLEVER initiated Makers' Club WerkHus)	X		X		Biodiversity/habitat provision; Information/knowledge about NBS, health and/or environmental awareness	Local residents of the neighbourhood; Pupils and teachers
HH CAL 1	ID-N8	Multigenerational bee-friendly shrub bed	X		X		Biodiversity/habitat provision; Aesthetic value; Space for social interaction/recreation	Local residents of the neighbourhood; Pupils and teachers
Gardens/parks								
LND CAL 2	NBS4	Outdoor social space with raingarden, fruit trees, greening and outdoor furniture (The Terrace)	X	X	X		Biodiversity/habitat provision; Space for social interaction/recreation; Rainwater management	Local residents of the neighbourhood
LND CAL 1	NBS2	Edible Garden (with trampolines)	X	X	X		Biodiversity/habitat provision; Space for social interaction/recreation; Space for movement (play, sports)	Local residents of the neighbourhood; Volunteers
ML CAL 2	N.A.	Community garden (with green walls, fruit trees, butterfly garden)	X		X		Biodiversity/habitat provision; Space for social interaction/recreation; Space for movement; Microclimate; Aestetich Value;	Local residents of the neighbourhood; Volunteers
LND CAL 3	NBS10	Activision of a courtyard space for gardening and food production (Atrium Allotment)	X	X	X		Biodiversity/habitat provision; Space for social interaction/recreation; Microclimate	Local residents of the neighbourhood
HH CAL 1	ID-N3	Climate trees and benches	X		X		Microclimate; Space for social interaction/recreation	Local residents of the neighbourhood
HH CAL 1	ID-N5	Temporary gardens (at refugee accommodation)	X		X		Space for social interaction/recreation	Residents of the building(s)
HH CAL 2	ID-N19	Transformation of rainwater retention basin into public park	X		X		Space for social interaction/recreation	Local residents of the neighbourhood

Gardens with educational activities								
HH CAL 3	ID-N20	Researchers' garden for school	X		X		Information/knowledge about NBS, health and/or environmental awareness; Biodiversity/habitat provision	Pupils and teachers; Local residents of the neighbourhood
HH CAL 3	ID-N22	Mobile School Garden	X				Information/knowledge about NBS, health and/or environmental awareness; Biodiversity/habitat provision	Pupils and teachers; Local residents of the neighbourhood
LND CAL 3	NBS7	Learning Garden which includes a large blue green planter that will be connected to a smart weather system	X	X	X		Information/knowledge about NBS, health and/or environmental awareness; Rainwater management	Pupils and teachers
LND CAL 3	NBS11	Green space development at school sites	X	X	X		Information/knowledge about NBS, health and/or environmental awareness; Biodiversity/habitat provision	Pupils and teachers
LND CAL 3	NBS9	Outdoor Classrooms	X	X	X		Information/knowledge about NBS, health and/or environmental awareness	Pupils and teachers
HH CAL 3	ID-N21	Mobile Aquaponics system for school	X		X		Information/knowledge about NBS, health and/or environmental awareness	Pupils and teachers
LND CAL 3	NBS12	Faith group green spaces	X		X		Space for social interaction/recreation	Local residents of the neighbourhood; Volunteers
Play								
LND CAL 2	NBS6	Upgrade of play area for older children (new play equipment), new planting also (Nature Based Play)	X	X	X		Space for social interaction/recreation; Space for movement (play, sports)	Local residents of the neighbourhood (children)
HH CAL 1	ID-N10	Nature experience playground	X		X		Space for social interaction/recreation; Space for movement (play, sports); Biodiversity/habitat provision; Information/knowledge about NBS, health and/or environmental awareness	Local residents of the neighbourhood
Green roofs/walls/streets								
HH CAL 1	ID-N2	Bee-friendly qualification of an existing green roof			X		Biodiversity/habitat provision	Local residents of the neighbourhood
ML CAL 1	N.A.	Green roofs	X	X	X		Microclimate; Energy efficiency of the building; Space for social interaction/recreation; Rainwater management	Residents of the building(s) (with disabilities and elderly)
ML CAL 1	N.A.	Rooftop multipurpose fruit gardens (on four towers)	X	X	X		Energy efficiency of the building; Space for social interaction/recreation; Rainwater management	Residents of the building(s) (social housing residents); Local residents of the neighbourhood
ML CAL 1	N.A.	Green wall	X	X			Microclimate; Energy efficiency of the building; Aesthetic value	Residents of the building(s) (employees); Local residents of the neighbourhood
HH CAL 2	ID-N12	Greening of noise barrier with diversified plants	X	X			Biodiversity/habitat provision; Microclimate; Aesthetic value	Local residents of the neighbourhood
HH CAL 2	ID-N13	Green façade with butterfly motif	X	X			Biodiversity/habitat provision; Microclimate; Aesthetic value; Information/knowledge about NBS, health and/or environmental awareness	Local residents of the neighbourhood
ML CAL 3	N. A.	Greening of a new railway stop (green walls, trees, canopy...) plus smart water system	X	X		X	Microclimate; Rainwater management; Biodiversity/habitat provision	Local residents of the neighbourhood
LND CAL 1	NBS1	Healthy Streets		X	X	X	Microclimate; Aesthetic value	Local residents of the neighbourhood

Technical/infrastructure measures									
HH CAL 1	ID-N1	Connected root tunnel system/ 7 climate trees	X			X	Microclimate; Rainwater management; Research and innovation	Local residents of the neighbourhood; Scientists
HH CAL 1	ID-N4	Connected tree pits and climate trees	X			X	Microclimate; Rainwater management; Research and innovation	Local residents of the neighbourhood; Scientists
HH CAL 2	ID-N16	Roadside Infiltration Planters				X	Rainwater management	Local residents of the neighbourhood; Residents of the street; Scientists
HH CAL 2	ID-N18	Smart Blue-Green Roof with Smart Flow Control App				X	Rainwater management; Research and innovation	Scientists
HH CAL 2	ID-N14	Blue roof technology as a drainage solution for inner urban paths				X	Rainwater management; Research and innovation	Scientists
HH CAL 2	ID-N15	Drainage analysis tool for heavy rainfall	X			X	Rainwater management	Local residents of the neighbourhoods
LND CAL 1	NBS3	Nature-based Sustainable Drainage Sytems		X	X	X	Rainwater management; Aesthetic value	Local residents of the neighbourhood
HH CAL 2	ID-N17	Retention space and earth dams in nature reserve		X		X	Rainwater management	Local residents of the neighbourhood

Activities/Programmes									
LND CAL 3	NBS13	Impelentation of a 5ft x 5ft vegetable patch (Allotment Residency)	X	X	X		Information/knowledge about NBS, health and/or environmental awareness	Local residents of the neighbourhood; Artists; Pupils and teachers
LND CAL 3	NBS14	Thamesmead Bloomin / Art Nature Thamesmead Home gardening promotion	X	X	X		Information/knowledge about NBS, health and/or environmental awareness	Local residents of the neighbourhood; Artists
LND CAL 3	NBS15	Community Greening Activation Grant Programme (community led projects / workshops were developed bringing people into the green space)	X	X	X		Information/knowledge about NBS, health and/or environmental awareness	Local residents of the neighbourhood
HH CAL 1	ID-N7	Historic NBS-sign with insect hotel	X		X		Information/knowledge about NBS, health and/or environmental awareness; Biodiversity/habitat provision	Local residents of the neighbourhood
HH CAL 1	ID-N11	CLEVER Parcours guidance system	X				Information/knowledge about NBS, health and/or environmental awareness; Biodiversity/habitat provision; Aesthetic value	Local residents of the neighbourhood

Business Models – Value Delivery and Value Capture

Measure			"Value delivery"			Value Capture	
"What was implemented"?							
CAL & City	ID-N	Intervention implemented	Key Partners	Key Resources	Investment size/costs of implementation	Potential revenue streams/savings	Value capture
Which CLEVER CAL belongs the measure to?	ID of measure	What kind of NBS was implemented?	*Governmental body *Private Sector *Non-governmental/ non- or for- profit entity *Academia & Educational institution *Citizens	What Key Resources do our Value Propositions require? *Physical *Financial *Intellectual * Human	(Total) Investment size/costs of implementation *Micro (< 10.000€) *Small (10.000€-50.000€) *Medium (50.000€-100.000€) *High (100.000€-250.000€) *Large (>250.000€)	For what value and benefits would our beneficiaries be willing to pay because they are "private" and offer revenue streams or cost reductions for themselves primarily? *Rather none *Less energy costs *Less (potential) damage costs *Higher property value *Harvest	Are private actors capturing monetary benefits? *Yes (private monetary benefits) *No (public benefits only)
Wild meadows/forests							
LND CAL 2	NBS5	Wild meadow (Rewilding Public Places)	Governmental body	Physical	Micro	Rather none	No
HH CAL 1	ID-N9	New Meadow orchard with early bloomers as ground cover	Private Sector; Non profit; Educational institution	Physical	Micro	Rather none	No
HH CAL 3	ID-N23	Turn your lawn into a flower meadow with an insect/ bug hotel	Citizens; Non-governmental/ non- or for-profit entity; Academia & Educational institution	Physical; Human	Medium	Rather none	No
LND CAL 3	NBS8	Tiny Forest (600 trees planted)	Non-governmental/ non- or for- profit entity; Private sector	Physical; Intellectual; Human	Small	Rather none	No
HH CAL 1	ID-N6	Insect hotel sculptures (by CLEVER initiated Makers' Club WerkHus)	Non-governmental/ non- or for- profit entity	Physical; Human	Small	Rather none	No
HH CAL 1	ID-N8	Multigenerational bee-friendly shrub bed	Private Sector	Physical; Human	Micro	Rather none	No
Gardens/parks							
LND CAL 2	NBS4	Outdoor social space with raingarden, fruit trees, greening and outdoor furniture (The Terrace)	Citizens	Physical; Financial	Large	Harvest	No
LND CAL 1	NBS2	Edible Garden (with trampolines)	Citizens	Physical; Human; Financial	Medium	Rather none	No
ML CAL 2		Community garden (with green walls, fruit trees, butterfly garden)	Non-governmental/ non- or for- profit entity; Citizens	Physical; Financial	Large	Harvest	No
LND CAL 3	NBS10	Activision of a courtyard space for gardening and food production (Atrium Allotment)	Citizens	Physical; Human	Micro	Harvest	No
HH CAL 1	ID-N3	Climate trees and benches	Governmental body; Private sector	Physical; Financial	Medium	Rather none	No
HH CAL 1	ID-N5	Temporary gardens (at refugee accommodation)	Citizens; Non-governmental/ non- or for-profit entity; Governmental body	Human, Physical; Financial	Small	Harvest	No
HH CAL 2	ID-N19	Transformation of rainwater retention basin into public park	Academia & Educational institution; Non-governmental/ non- or for- profit entity; Governmental body	Human; Financial	High	Rather none	No

Gardens with educational activities							
HH CAL 3	ID-N20	Researchers' garden for school	Governmental body; Non-governmental/ non- or for- profit entity; Private Sector	Human; Financial	Micro	Rather none	No
HH CAL 3	ID-N22	Mobile School Garden	Governmental body; Non-governmental/ non- or for- profit entity; Private Sector; Citizens	Human; Financial	Small	Rather none	No
LND CAL 3	NBS7	Learning Garden which includes a large blue green planter that will be connected to a smart weather system	Academia & Educational institution	Physical	Medium	Rather none	No
LND CAL 3	NBS11	Green space development at school sites	Academia & Educational institution	Physical; Human	Micro	Rather none	No
LND CAL 3	NBS9	Outdoor Classrooms	Academia & Educational institution	Intellectual; Human	N.A.	Rather none	No
HH CAL 3	ID-N21	Mobile Aquaponics system for school	Governmental body; Non-governmental/ non- or for- profit entity; Private Sector; Citizens	Human; Financial	Micro	Rather none	No
LND CAL 3	NBS12	Faith group green spaces	Non-governmental/ non- or for- profit entity (Churches)	Human	Micro	Rather none	No
Play							
LND CAL 2	NBS6	Upgrade of play area for older children (new play equipment), new planting also (Nature Based Play)	Private sector	Physical; Financial	High	Rather none	No
HH CAL 1	ID-N10	Nature experience playground	Private sector; Governmental body; Citizens; Non-governmental/ non- or for-profit entity	Physical; Human; Financial	Large	Rather none	No
Green roofs/walls/streets							
HH CAL 1	ID-N2	Bee-friendly qualification of an existing green roof	Private sector; Governmental body	Physical; Financial	Micro	Rather none	No
ML CAL 1	N.A.	Green roofs	Private sector; Non Profit;	Physical; Financial	Medium	Higher property value/rents; Less energy costs	Yes (owners of the building)
ML CAL 1	N.A.	Rooftop multipurpose fruit gardens (on four towers)	Private sector;	Physical; Financial	Large	Higher property value/rents; Less energy costs	Yes (owners of the building)
ML CAL 1	N.A.	Green wall	Private sector;	Physical; Financial	High	Less energy costs; Harvest	Yes (owners and residents of the building)
HH CAL 2	ID-N12	Greening of noise barrier with diversified plants	Private sector; Governmental body; Citizens	Physical; Financial	Micro	Rather none	No
HH CAL 2	ID-N13	Green façade with butterfly motif	Private sector; Governmental body; Citizens; Non-governmental/ non- or for-profit entity	Physical; Financial	Small	Less energy costs; Higher property value	Yes (owners of the building)
ML CAL 3	N. A.	Greening of a new railway stop (green walls, trees, canopy...) plus smart water system	Governmental body; Academia & Educational institution	Physical; Financial	Large	Rather none	No
LND CAL 1	NBS1	Healthy Streets	Private sector; Governmental body	Physical; Financial; Intellectual	Large	Rather none	No

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		Technical/infrastructure measures					
HH CAL 1	ID-N1	Connected root tunnel system/ 7 climate trees	Private sector; Governmental body	Physical; Financial; Intellectual	High	Rather none	No
HH CAL 1	ID-N4	Connected tree pits and climate trees	Private sector; Governmental body	Physical; Financial; Intellectual	High	Rather none	No
HH CAL 2	ID-N16	Roadside Infiltration Planters	Private sector; Governmental body	Financial; Physical	High	Rather none	No
HH CAL 2	ID-N18	Smart Blue-Green Roof with Smart Flow Control App	Private sector; Governmental body	Physical; Financial; Intellectual	Small	Rather none	No
HH CAL 2	ID-N14	Blue roof technology as a drainage solution for inner urban paths	Private sector; Governmental body; Academia & Educational institution	Physical; Financial; Intellectual	Medium	Rather none	No
HH CAL 2	ID-N15	Drainage analysis tool for heavy rainfall	Private sector; Governmental body; Academia & Educational institution	Financial; Intellectual	Medium	Rather none	No
LND CAL 1	NBS3	Nature-based Sustainable Drainage Sytems	Private sector	Financial; Intellectual	Medium	Less (potential) damage costs	Yes (owners of the building)
HH CAL 2	ID-N17	Retention space and earth dams in nature reserve	Private sector; Governmental body	Financial; Physical	Small	No	No
		Activities/Programmes					
LND CAL 3	NBS13	Impelentation of a 5ft x 5ft vegetable patch (Allotment Residency)	Citizens	Human; Physical	Micro	Rather none	No
LND CAL 3	NBS14	Thamesmead Bloomin / Art Nature Thamesmead Home gardening promotion	Citizens	Human; Physical	Micro	Higher property value/rents	Yes (owners of the building)
LND CAL 3	NBS15	Community Greening Activation Grant Programme (community led projects / workshops were developed bringing people into the green space)	Citizens	Human	Micro	Rather none	No
HH CAL 1	ID-N7	Historic NBS-sign with insect hotel	Private sector; Governmental body; Non-governmental/ non- or for- profit entity; citizens	Human, Intellectual; Financial	Small	Rather none	No
HH CAL 1	ID-N11	CLEVER Parcours guidance system	Private sector; Governmental body; Non-governmental/ non- or for- profit entity; citizens	Human, Intellectual; Financial	High	Rather none	No

Financing Models and Governance Models

Measure			Financing Models	Governance Models	
"What was implemented"?					
CAL & City	ID-N	Intervention implemented		Governance arrangements	Level of Citizen Engagement
Which CLEVER CAL belongs the measure to?	ID of measure	What kind of NBS was implemented?	Combinations of type of funding: *Direct funding *Debt *Equity and funders: *Local government *Central government (national or international) *Philanthropy and charity *Commercial investors *Social investors *Citizens *Other (private companies)	*Government actor led *Co-Management *Co-Governance/co-production *Non-government actor led	*None *Inform *Consult *Involve *Collaborate *Empower
Wild meadows/forests					
LND CAL 2	NBS5	Wild meadow (Rewilding Public Places)	Direct funding by philanthropy and charity	Non-government actor led	Inform
HH CAL 1	ID-N9	New Meadow orchard with early bloomers as ground cover	Direct funding by central government; Direct funding by philantrophy and charity	Co-Management	Involve
HH CAL 3	ID-N23	Turn your lawn into a flower meadow with an insect/ bug hotel	Direct funding by central government	Co-Governance/Co-production	Collaborate; Empower
LND CAL 3	NBS8	Tiny Forest (600 trees planted)	Direct funding by central government; Direct funding by philanthropy and charity	Co-Management	Collaborate
HH CAL 1	ID-N6	Insect hotel sculptures (by CLEVER initiated Makers' Club WerkHus)	Direct funding by local government	Co-Governance/Co-production	Collaborate; Empower
HH CAL 1	ID-N8	Multigenerational bee-friendly shrub bed	Direct funding by central government	Co-Governance/Co-production	Involve; Collaborate

Gardens/parks					
LND CAL 2	NBS4	Outdoor social space with raingarden, fruit trees, greening and outdoor furniture (The Terrace)	Direct funding by philanthropy and charity	Co-Governance	Collaborate
LND CAL 1	NBS2	Edible Garden (with trampolines)	Direct funding by philanthropy and charity	Co-Management	Collaborate
ML CAL 2		Community garden (with green walls, fruit trees, butterfly garden)	Direct funding by local government; Direct funding by central government	Co-Management	Empower
LND CAL 3	NBS10	Activision of a courtyard space for gardening and food production (Atrium Allotment)	Direct funding by central government	Co-Management	Empower
HH CAL 1	ID-N3	Climate trees and benches	Direct funding by central government	Governmental actor led	Inform
HH CAL 1	ID-N5	Temporary gardens (at refugee accommodation)	Direct funding by central government	Co-Management; Co-Governance/co-pro	Involve; Collaborate; Empower
HH CAL 2	ID-N19	Transformation of rainwater retention basin into public park	Direct funding by central government; Direct funing by other	Non-government actor led	Involve
Gardens with educational activities					
HH CAL 3	ID-N20	Researchers' garden for school	Direct funding by central government; Direct funding by local government	Co-Management; Co-Governance/co-pro	Involve; Collaborate
HH CAL 3	ID-N22	Mobile School Garden	Direct funding by central government; Direct funding by philanthropy and charity	Co-Management; Co-Governance/co-pro	Involve; Collaborate; Empower
LND CAL 3	NBS7	Learning Garden which includes a large blue green planter that will be connected to a smart weather system	Direct funding by central government; Direct funding by other	Co-production	Collaborate
LND CAL 3	NBS11	Green space development at school sites	Direct funding by central government	Co-production	Collaborate
LND CAL 3	NBS9	Outdoor Classrooms	Direct funding by philanthropy and charity	Non-government actor led	Inform
HH CAL 3	ID-N21	Mobile Aquaponics system for school	Direct funding by central government; Direct funding by local government	Co-Management; Co-Governance/co-pro	Involve; Collaborate; Empower
LND CAL 3	NBS12	Faith group green spaces	Direct funding by central government	Co-Management	Empower

Play					
LND CAL 2	NBS6	Upgrade of play area for older children (new play equipment), new planting also (Nature Based Play)	Direct funding by philanthropy and charity	Co-production	Collaborate
HH CAL 1	ID-N10	Nature experience playground	Direct funding by local government; Direct funding by central government	Governmental actor led	Involve
Green roofs/walls/streets					
HH CAL 1	ID-N2	Bee-friendly qualification of an existing green roof	Direct funding by central government; Direct funding by other	Governmental actor led	None
ML CAL 1	N.A.	Green roofs	Direct funding by central government; Direct funding by other	Co-Management	Involve; Collaborate
ML CAL 1	N.A.	Rooftop multipurpose fruit gardens (on four towers)	Direct funding by central government; Direct funding by other	Co-Management	Collaborate; Empower
ML CAL 1	N.A.	Green wall	Direct funding by central government; Direct funding by other	Governmental actor led	Consult; involve
HH CAL 2	ID-N12	Greening of noise barrier with diversified plants	Direct funding by local government; Direct funding by central government	Governmental actor led	Inform; Involve
HH CAL 2	ID-N13	Green façade with butterfly motif	Direct funding by central government; Direct funding by other	Co-Management; Co-Governance/co-pro	Involve; Collaborate
ML CAL 3	N. A.	Greening of a new railway stop (green walls, trees, canopy…) plus smart water system	Direct funding by local government; Direct funding by central government	Governmental actor led	Consult
LND CAL 1	NBS1	Healthy Streets	Direct funding by philanthropy and charity	Non-government actor led	Collaborate

Technical/infrastructure measures					
HH CAL 1	ID-N1	Connected root tunnel system/ 7 climate trees	Direct funding by local government; Direct funding by central government	Governmental actor led	Inform
HH CAL 1	ID-N4	Connected tree pits and climate trees	Direct funding by local government; Direct funding by central government	Governmental actor led	Inform
HH CAL 2	ID-N16	Roadside Infiltration Planters	Direct funding by local government; Direct funding by central government	Governmental actor led	Inform; Involve
HH CAL 2	ID-N18	Smart Blue-Green Roof with Smart Flow Control App	Direct funding by central government; Direct funding by other	Non-government actor led	Inform
HH CAL 2	ID-N14	Blue roof technology as a drainage solution for inner urban paths	Direct funding by local government; Direct funding by central government	Governmental actor led	None
HH CAL 2	ID-N15	Drainage analysis tool for heavy rainfall	Direct funding by central government	Governmental actor led	Inform
LND CAL 1	NBS3	Nature-based Sustainable Drainage Sytems	Direct funding by philanthropy and charity	Non-government actor led	Collaborate
HH CAL 2	ID-N17	Retention space and earth dams in nature reserve	Direct funding by central government	Governmental actor led	None
Activities/Programmes					
LND CAL 3	NBS13	Impelentation of a 5ft x 5ft vegetable patch (Allotment Residency)	Direct funding by central government	Co-management	Empower
LND CAL 3	NBS14	Thamesmead Bloomin / Art Nature Thamesmead Home gardening promotion	Direct funding by central government	Co-Governance / Co-production	Empower
LND CAL 3	NBS15	Community Greening Activation Grant Programme (community led projects / workshops were developed bringing people into the green space)	Direct funding by central government	Co-Governance / Co-production	Empower
HH CAL 1	ID-N7	Historic NBS-sign with insect hotel	Direct funding by central government	Co-Management; Co-Governance/co-pro	Involve; Collaborate
HH CAL 1	ID-N11	CLEVER Parcours guidance system	Direct funding by central government	Co-Management; Co-Governance/co-pro	Involve; Empower