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Impact Assessment Methodology for NRW.BANK Social Bonds

Framework and Rationale
for NRW.BANK Social Bonds 2022

Jens Teubler

on behalf of



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The current method paper represents version 4.1 and refers directly to the NRW.BANK Social Bond #2022-1. It is expected that a further update of this methodology will be made available in 2024.

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1 Introduction

The paper at hand presents the principles and methods applied for the impact assessment of NRW.BANK Social Bonds. So far, no commonly applied methodology has been established for impact assessments of Social Bonds. Guidelines, such as the Social Bond Principles by the International Market Association (ICMA, 2022), are currently mainly concerned with categorization and eligibility of proceeds as well as the certification by second party opinion (SPO) providers. Regarding the aspect of reporting, it recommends "[...] the use of qualitative performance indicators and, where feasible, quantitative performance measures (e.g. number of beneficiaries, especially from target populations) and disclosure of the key underlying methodology and/or assumptions used in the quantitative determination" (ICMA, 2022, p. 5). It is also suggested that projects and measures are mapped to the Sustainable Development Goals (**all of which are already provided by NRW.BANK and its contractors**). However, impact qualification, quantification and reporting are still in its infancy.

This method paper, and its predecessors, attempts to fill this gap by suggesting a heuristic, but empirically feasible solution to the problem. It is thus not only intended to provide the foundation for the actual impact report, but invites other practitioners and scholars to participate in the search for adequate methodologies. The ongoing dissertation by the author ("ESG Logic Models") will also pick up this thread by providing a model for "Finance for Sustainability" that is robustly grounded in theory and good scholarly practices.

2 Principles of NRW.Bank Social Bonds

Before deciding on a certain method, experts suggest starting with a holistic framework that describes the boundaries of the analysis, its process, the methods applied and the content to be reported (Ruff & Olsen, 2016).

2.1 System Boundaries

The NRW.BANK is the state development bank of the federal State of North Rhine-Westphalia (NRW) and as such a public agency. It manages refinancing and hands out development loans. Its Social Bond refinances investments into public and private institutions in NRW, ranging from the modernization of schools to stimuli into structurally weak regions. All inputs are therefore restricted to NRW and its effects are aimed to improve conditions in the federal State over the next couple of years. However, the outcome of the measures is not restricted to the State and could very well affect additional actors or regions in the long run.

2.2 Process

The NRW.BANK issues a bond to refinance selective loan programs that are in accordance with its sustainability guidelines as well as the ICMA Social Bond Principles. The SPO provider ISS ESG assesses the sustainability quality of the issuer and its social bond pool on a regular basis. The net proceeds will be allocated to either finance new eligible social expenditures or to refinance social projects whose disbursements occurred no earlier than 36 months prior to the year of issuance. The Wuppertal Institut (WI) has been asked to qualify, estimate, or quantify the direct and indirect social impacts or outcomes after the fact (ex post evaluation).

The WI is independent in its evaluation and applies methods by its own discretion. The required data is provided by the NRW.BANK, publicly available or available for scientific purposes.

2.3 Update of the methodology

The paper at hand represents the second update of the original methodology on impact logics and theory-based evaluations of NRW.BANK Social Bonds (previous versions were numbered 2.3 and 3.3). Changes to the impact logic are mainly restricted to visuals (e.g., closer alignment of color coding to European energy-efficiency scheme) and the operationalization of hazards and rebounds. The latter are now shown as separate indicators with arrows in their respective color point back towards the desired causal relationships. The specifics of the financing (orange Inputs representing intents and targets of the different loans) are now attached to the Activities, whereas previous visualities covered this aspect with separate entities in white. In addition, the related Activities are now also shown for each subsequent desired effect in the outcome-pathways. Thus, the Theories-of-Change can now also be read "backwards" towards the activities by the main actors who put the provided capital to a specific use.

The current depiction of Outcome-Pathways (see section 3.2) also depicts different types of activities that contribute jointly to a particular output. For example, the acquisition of a new home also requires the same, or other actors, to actually build or purchase a building. This therefore relates to the question of attributions by different actors and provides a plausible basis for additional allocations if necessary.

All four (previously documented) pathways were also updated in regard to the consistency of their language and their logic. For example, the desired outcome of stabilized rents from homeowner-ship loans now explicitly stems from the availability of additional rental space, while the original impact pathway incorporated this effect indirectly. In addition, two new pathways are introduced that cover financing of "Access to Essential Services: Health" and "Disaster Management". These, as well as the previous categories, are described in the most recent framework of the issuer (NRW.BANK, 2022).

Moreover, all categories are now more formally described with hypotheses instead of narratives (see section 3.5).

3 Method: Theory of Change

Theory of Change (ToC) is a theory-based evaluation method that allows to evaluate measures that promote social change (the following information is largely based on Jackson, 2013; Taplin et al., 2013; Taplin & Clark, 2012). Its strength lies in its open design (tailored to the needs and perceived influence of the issuer), the definition of a *responsibility ceiling* and its ability to distinguish between *Inputs* and *Outputs* of measures as well as their *intermediate* and *long-term Outcomes*. An ideal theory of change not only shows the impact of the institution that applies it, but also its interactions with other stakeholders and conditions along the cause-effect chain. For social impact assessments, it is a tool to identify and qualify indicators and a map that shows at which point these investments enable broader societal goals.

3.1 Theoretical Framework

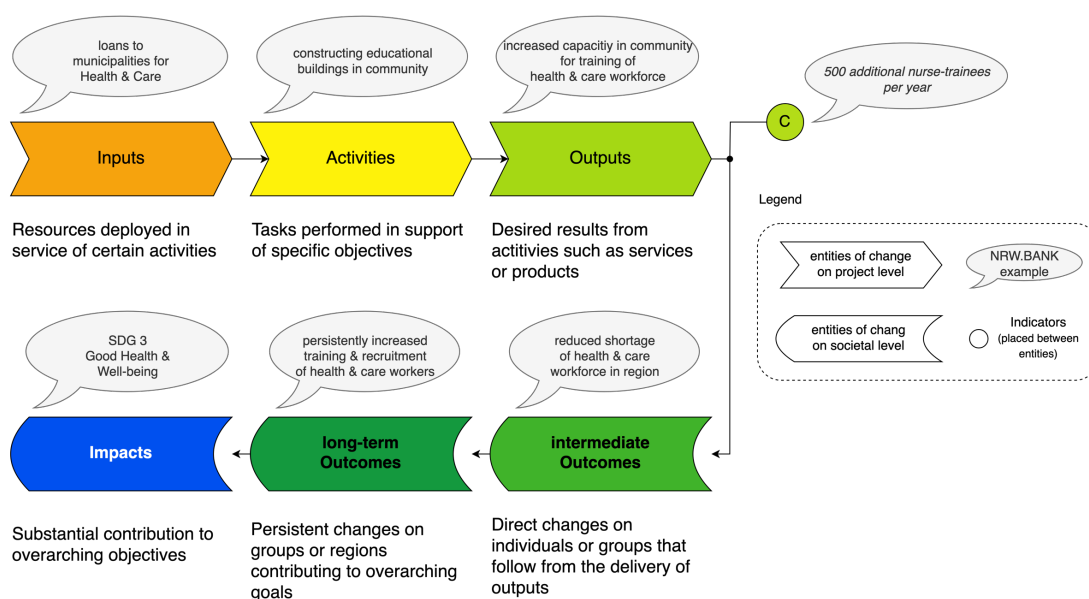
The ToC method applied here is understood to comply with *case-oriented* evaluation practices (in opposition to *population-oriented* evaluations) and with *asymmetric causal claims* (Goertz & Mahoney, 2012). Outcomes are assumed to occur if the intervention plays out as envisioned by the issuer. There is therefore no investigation on potential outcomes in cases where this is not true ($X \rightarrow Y$ but $\sim X \rightarrow ?$).

The framework is embedded in ontological determinism, that is, it is assumed that “outcomes happen for a reason”. However, the appropriate epistemology to test the plausibility of the claims is probabilistic in nature and is especially open to Bayesian Epistemology and methods (as shown by the author in Teubler & Schuster (2022a)). Although the entirety of each ToC can be understood as a “cause-of-effects” narrative, both Activities and intermediate Outcomes can also be described as “within-case causal-mechanics”. Thus it is possible, and planned for the future, to assess these mechanics with methods like Process-Tracing (PT) to look for *fingerprints* that are unique to the cases described here but surprising under alternative explanations (see Beach & Pedersen (2019) for definitions of the terms and applications of the method).

3.2 Outcome Pathways

The ToC defines impacts in *Outcome-Pathways*. These *Outcomes* represent desired changes in society, while *Impacts* represent the ultimate goal of an institution or project. Usually, these *Impacts* and *Outcomes* cannot be achieved by the evaluated measure alone but require additional conditions and stakeholders. The most relevant of these conditions are called *pre-conditions* and are part of the underlying *hypotheses* for the *narratives* described in the impact report. A ToC often starts at the top with the overarching goals of a project (*Impacts*) and is then traced back to *long-term Outcomes*, *intermediate Outcomes*, *Outputs*, *Activities*, and *Inputs*. Figure 1 shows the schematic of an outcome pathway and defines each step.

Figure 1: Outcome-pathway (NRW.BANK example for Access to Essential Services: Health)



Source: own compilation based on Jackson, 2016

3.3 Accountability Ceiling

It is also common to define a so-called *accountability ceiling*, which defines for which changes the institution holds itself accountable. For a bank, this can be restricted to the Inputs as they represent loans, although defining loan conditions can also shift the accountability ceiling higher up to also cover Activities and Outputs (Outputs are currently assumed to be that ceiling).

3.4 Narrative

Each outcome pathway is accompanied by a narrative (called “rationale” in the main impact report), that explains the logic of the pathway and key assumptions. A narrative may include contextual and background information, especially in regard to the empiric evidence for its logic. The purpose of a narrative is to convey the theory quickly to others and to better understand how the elements of the pathway work as a whole.

3.5 Hypotheses

Former method papers focused on narratives as a mean to convey the causal logic to the reader. The current methodology focuses on hypotheses instead. These are more formal descriptions of the premises and conclusions involved in the ToCs. This facilitates the testing of the underlying assumptions and provides an overall better “fit” to the ideal (potential indicators) and the actual estimates in the impact report.

3.6 Indicators

Indicators in a ToC are visible evidence of meeting goals and can involve qualitative as well as quantitative information. They are ideally developed before starting the process and built around specific monitoring targets in regard to the number of people reached, a threshold for what has to change and a timeframe by when the change needs to occur. For the methodology at hand, indicators are evaluated after the fact and based on the information provided. As such, they are activity-/output-/outcome-indicators that are quantitative but not attached to quantitative targets, thresholds, or timeframes. Any qualitative information on empirical evidence is covered by the hypotheses instead.

However, each ToC also comes with considerations on so-called *Potential Indicators*. These are indicators which we would like to find, assuming we had an abundance of data. They represent the best-needed metrics providing evidence for the achievement of Outcomes and Outputs. They can therefore be used as a point of reference by comparing the actual indicators in the impact assessments to these ideal indicators (e.g., regarding empirical certainty, empirical uniqueness, and robustness).

4 Indicator Classification for NRW.BANK Social Bonds

Indicators for Social Bonds measure or estimate desired Activities, Outputs and Outcomes that can be traced back to the original Inputs by the issuer. Ideally, these effects lead to a positive progression of the desired outcome. However, potential negative effects should be reported as well if known.

For the NRW.BANK Social Bond, indicators are classified according to their position in the Outcome-Pathway and their type. They range from A to E, following the example of energy efficiency standards in the EU (see Table 1). The highest standard

(A) is attributed to a measured effect (indicated with +) that is visible evidence for a desired long-term outcome. In opposition, lower standards are attributed to indicators that are restricted to activities (D, standard practice) or can only be estimated (indexed with 0 for baseline). The minimum for a quantitative indicator (E) is proof that a certain amount of money was delivered to the intended beneficiaries (usually covered by the SPO certification or the use-of-proceeds).

It is currently (2023) highly unlikely that any impact analysis would measure actual effects on A or B-level, as data, model and monitoring requirements are very high for these contexts. However, the current impact report does indeed include three such indicators that are based on estimates:

- property for vulnerable groups in [housing units]
- employment growth in structural-weak regions in [additional employees]
- increase of graduates from health & care workforce in [graduates]

Best-practice at the moment is therefore the quantification on C-level, which we try to achieve as much as possible in our impact reports.

Negative effects in this scheme can and should be reported as well. They usually take the form of control variables that should be monitored because they show the risk of reduced outputs (F) or even unintended negative side-effects for society (G).

Although we could not implement quantified indicators to that effect (yet), they are explicitly described in the resulting hypotheses in each category.

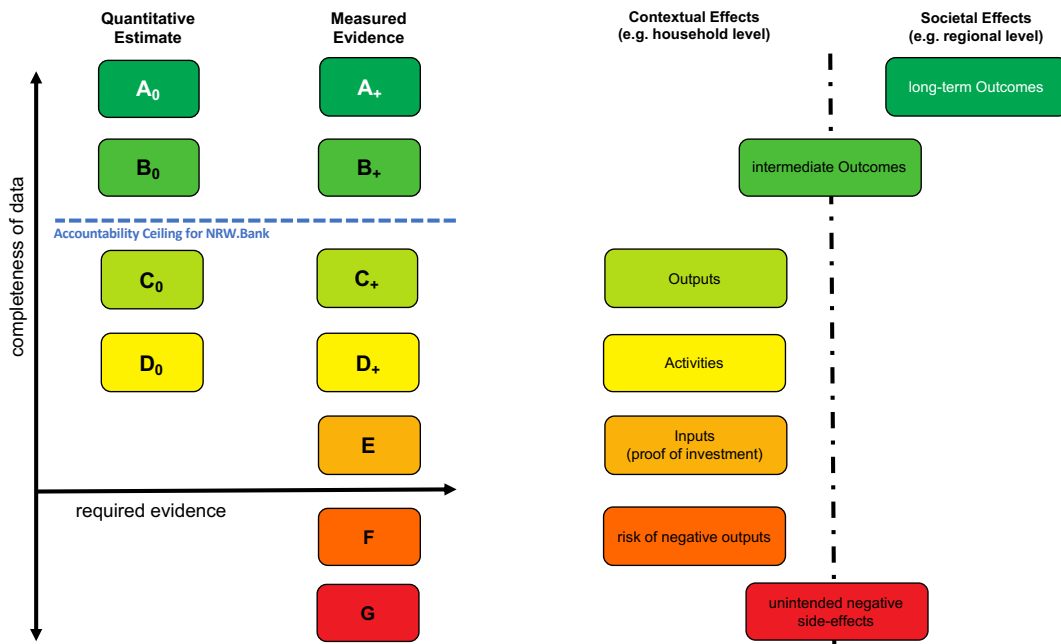
Table 1: Indicator types, direction, context, qualifiability and quantifiability in Social Bonds

Class	Indicator-Type	direction	Context	Current Qualifiability in SBs "Whats likely to happen?"	Current Quantifiability in SBs "How large is the effect?"
A	long-term outcome	positive	society	low – can be based on studies that deal with related research questions	very low (best needed)– requires monitoring and data on control groups
B	intermediate outcome	positive	communities or regions	medium – can be based on observed policy effects in similar communities	low (best-in-class)–requires monitoring on community level
C	output	positive	target population or company	medium – can be based on statistics and/or literature	medium (best practice) – requires data by issuer but also other sources
D	activity	positive	beneficiaries	high – can be based on eligibility assessments	high (standard in SB reporting) –requires mainly data by issuer
E	input	neutral	beneficiaries	very high –can be based on standards & guidelines	very high– minimum requirement for reporting
F	hazard	negative	target population or company	medium – can be based on qualitative risk assessments or observed effects	low – requires scenarios or quantitative risk assessments
G	rebound	negative	society	low – can be based on ex-post evaluation	very low – requires studies on non-intended side-effects of policies

Source: own compilation

Figure 2 shows the resulting classification system for indicators in the NRW.BANK Social Bond impact assessment. As shown there, data requirements increase for higher quality indicators that show effects on larger populations (intermediate outcomes) or even whole regions.

Figure 2: Indicator classification system for NRW.BANK SIBs



Source: own compilation

5 Outcome Pathways

The use of proceeds differentiates 6 types of impacts: Affordable Home Ownership, SME Financing and Employment Generation, Access to Essential Services: Health, Access to Essential Services: Education, Access to Public Goods and Services, and Disaster Management.

The NRW.BANK Social Bond framework (as well as the future impact report) can be found at: <https://nrwbank.de/>

Each category requires its own Outcome-Pathway (see following section on operationalization) and definition of potential indicators that are shown on the following pages.

5.1 Operationalization of outcome-pathways

The Outcome-Pathways for each category are drawn horizontally from the outside inwards.

The first step is the definition of Inputs (financing by issuer) and Impacts (in form of Sustainable Development Goals (SDGs)). These definitions are provided by the issuer's framework (NRW.BANK, 2022).

The second step relates to the definition of long-term Outcomes. These are based on both the issuer's framework as well as the official SDG targets (see United Nations (2022)).

In the third step, the intermediate Outcomes are defined by the author. These desired outcomes are both related to the pre-conditions for long-term Outcomes as well as the desired outcomes of the issuer.

The fourth step then connects the Inputs by the issuer to the physical (or monetary) realization in form of Activities. This "materialization" is both affected by the defined Outcome-Pathways and information of the issuer's loan programs.

The fifth step then connects Activities to Outputs and Outputs to Outcomes. The convention here is that there are no connections between Activities. The Outputs, which are defined as effects "that increase/decrease" or "improve" conditions, are not restricted in that way. More than one Output can be connected to an Outcome and some Outputs contribute to more than one pathway.

The six and final step relates to Hazards and Rebounds. Hazards are outputs that describe potential negative trade-offs between activities of the same actor or with activities of other actors. They are described by arrows from Outputs pointing back to Activities. Rebounds relate to the compensation or overcompensation of outcomes from hazards. They are described by arrows from long-term outcomes pointing back to the intermediate Outcomes.

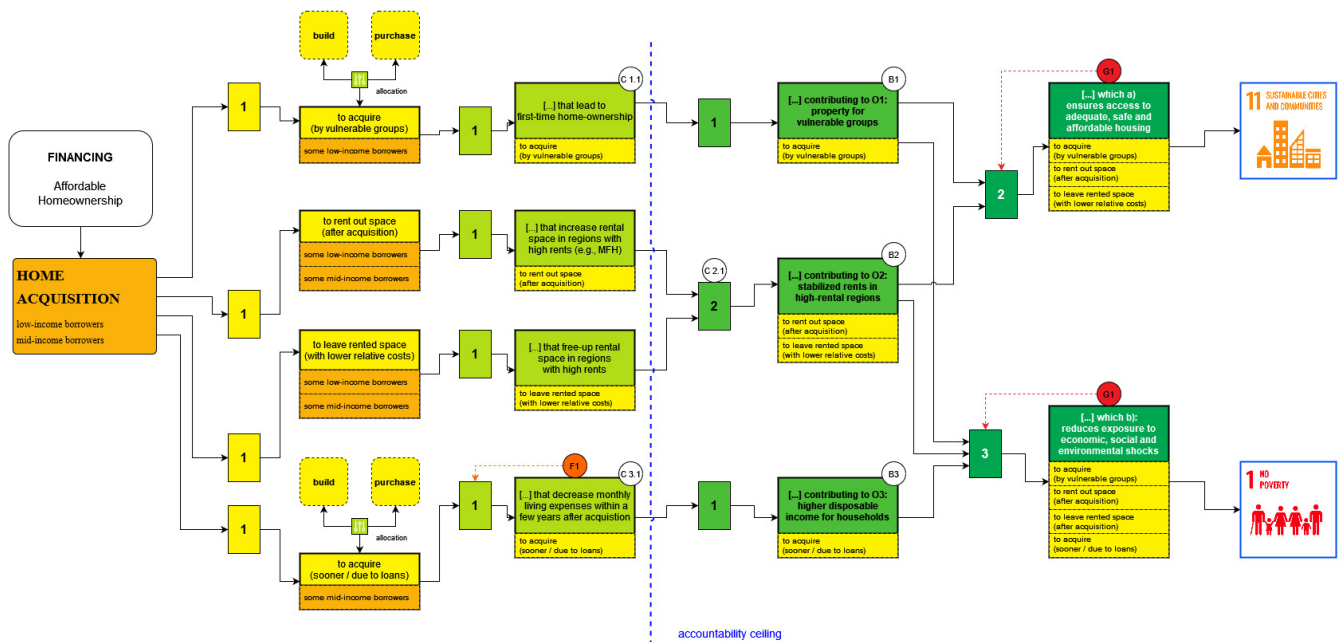
5.2 Affordable Home Ownership

5.2.1 Hypotheses

Pathway	Hypotheses to be investigated (activities Outputs <i>intermediate Outcomes</i> longterm Outcomes IMPACTS <u>pre-conditions</u> hazards potential rebounds)
O1	<p>Affordable Homeownership loans lead to first-time homeownership via home-acquisition for some low-income borrowers. This ensures access to adequate, safe, and affordable housing (SDG 11: SUSTAINABLE CITIES & COMMUNITIES) if it contributes to property for vulnerable groups* as a consequence. This outcome could potentially be overcompensated, if the borrowers' activities function as an additional driver for rent increases in the targeted region.</p> <p>No additional pre-conditions have to be met.</p>
O2	<p>Affordable Homeownership loans lead to increased rental space as well as freed rental space in regions with high rents from some borrowers renting out or leaving their former rental space. This ensures access to adequate, safe, and affordable housing (SDG 11: SUSTAINABLE CITIES & COMMUNITIES) and reduces exposures to economic, social, and environmental shocks (SDG 1: NO POVERTY) if these activities contribute to stabilized rents in high-rental regions. This outcome could potentially be overcompensated, if the borrowers' activities function as an additional driver for rent increases in the targeted region.</p> <p>This outcome is also conditioned on borrowers upgrading their living situation (e.g., higher relative costs for property after acquisition) after leaving rented space.</p>
O3	<p>Affordable Homeownership loans lead to decreased monthly expenses within a few years after acquisition by some borrowers. This reduces exposures to economic, social, and environmental shocks (SDG 1: NO POVERTY) if this acquisition leads to a higher disposable income for these households. This outcome can be reduced if the monthly credit costs after acquisition require borrowers to cut back on other expenditures (including savings). It could potentially also be overcompensated, if the borrowers' activities function as an additional driver for rent increases in the targeted region.</p> <p>This outcome is conditioned on borrowers not upgrading their living conditions too much or from a position with a high portion of equity.</p>

5.2.2 Outcome-pathways

Theory of Change - Affordable Homeownership



5.2.3 Potential Indicators

We identify 3 *best-needed* indicators for intermediate Outcomes (quality B) and 3 *best-needed* indicators for Outputs (quality C). The following table lists these indicator suggestions.

Pathways	Indicator Suggestion	
B1	change in homeownership ratio for vulnerable households in NRW [%]	
	C1.1	number of newly acquired homes by vulnerable households among borrowers [1/a]
B2	change in local ^{a)} rent index compared to average rate in NRW [%]	
	C2.1	change in local ^{a)} rental space in regions with high rents [m ²]
B3	change in monthly disposable income of borrowers [EUR]	
	C3.1	change of monthly expenses for residency – 1 year after acquisition ^{b)} [EUR]

^{a)} according to postcode of borrower
^{b)} see Teubler & Schuster (2022) for reasoning

5.3 SME Financing and Employment Generation

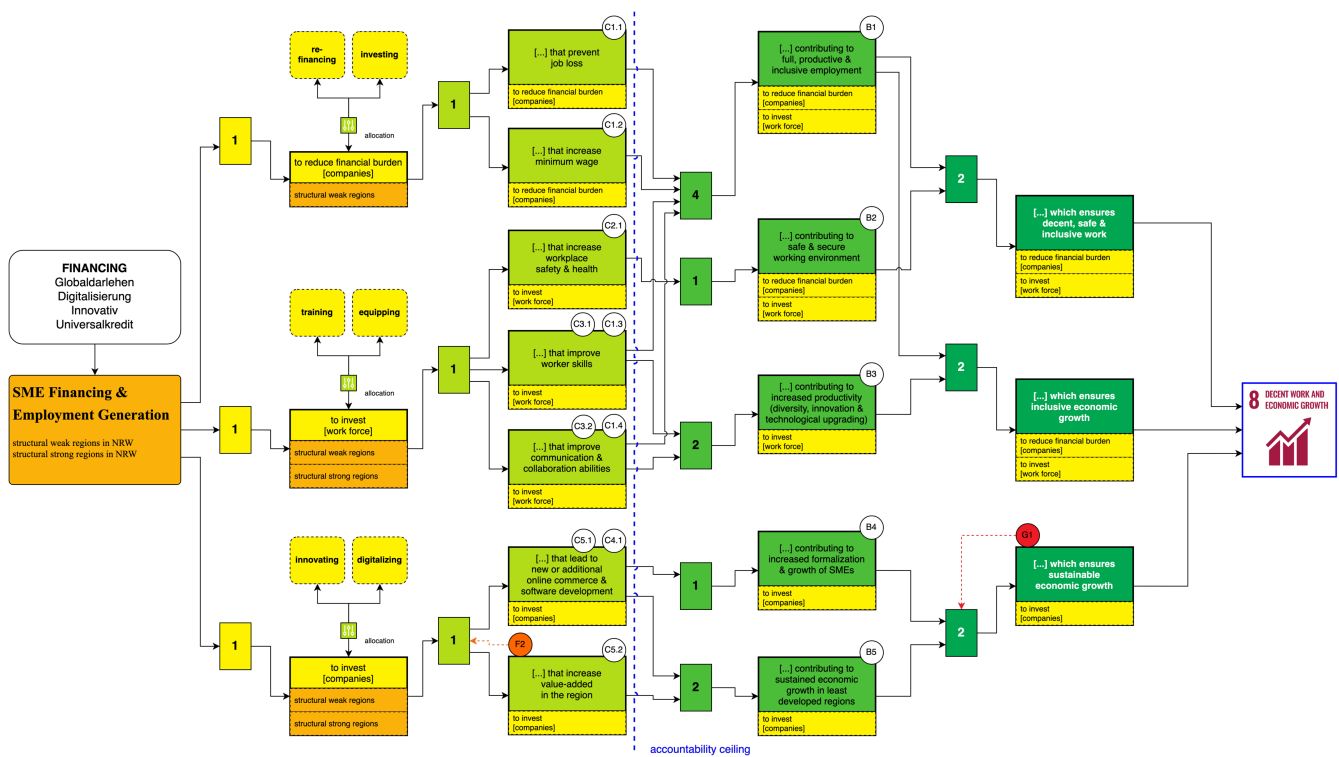
5.3.1 Hypotheses

Pathway	Hypotheses to be investigated (activities Outputs intermediate Outcomes longterm Outcomes IMPACTS pre-conditions hazards potential rebounds)
O1	The NRW.BANK loans for SME Financing can prevent job loss and increase the minimum wage via reducing the financial burden for companies. This ensures decent, safe & inclusive work as well as inclusive economic growth (SDG 8: DECENT WORK & ECONOMIC GROWTH) if it contributes to full, productive & inclusive employment as a consequence. This outcome is conditioned on sustaining the economic viability of companies in the affected regions.
O2	The NRW.BANK loans for SME Financing can increase workplace safety & health via investing into the workforce. This ensures decent, safe & inclusive work (SDG 8: DECENT WORK & ECONOMIC GROWTH) if it contributes to a safe & secure working environment as a consequence.
O3	The NRW.BANK loans for SME Financing can improve worker skills as well as their communication & collaborative abilities via investing into the workforce. This ensures inclusive economic growth (SDG 8: DECENT WORK & ECONOMIC GROWTH) if it contributes to increased productivity through diversity, innovation, and technological upgrades as a consequence.
O4	The NRW.BANK loans for SME Financing can lead to new or additional e-commerce & software development via direct investments by companies using the loans. This ensures sustainable economic growth (SDG 8: DECENT WORK & ECONOMIC GROWTH) if it contributes to the increased formalization & growth of SMEs as a consequence. This outcome can be negated, if most of the capital is allocated towards regions that are already structurally strong.
O5	The NRW.BANK loans for SME Financing can lead increase the value-added in the region via directly investing in the companies. It can also lead to new or additional e-commerce & software development via direct investments by companies using the loans. This ensures sustainable economic growth (SDG 8: DECENT WORK & ECONOMIC GROWTH) if it contributes to sustained economic growth in the least developed regions as a consequence. This outcome can be negated, if most of the capital is allocated towards regions that are already structurally strong. It can also be reduced, if the value-added reduces employment rates for low-skilled workers.

5.3.2 Outcome-pathway

There are 5 outcome-pathways linked to 7 predicted distinct outputs. Each output functions as a single or part of a set of causes for only one of these intermediate Outcomes, whereas each of the long-term Outcomes requires two of these Outcomes.

Theory of Change - SME Financing and Employment Generation



5.3.3 Potential Indicators

We identify 5 best-needed indicators for intermediate Outcomes (quality B) and 10 best-needed indicators for Outputs (quality C). The following table lists these indicator suggestions.

Pathways	Indicator Suggestion [E: employee I: Interactions]	
B1	change in employment ratio in affected region [%]	
	C1.1	change in number of extended work contracts [%]
	C1.2	change in minimum wage of company [EUR/E]
	C1.3	change in average hours of professional training [h/E]
B2	change in sick days in the affected region [d/cap]	
	C2.1	number of work-related accidents per employee [1/E]
B3	change in gross domestic product per hour worked in affected region [EUR/h]	
	C3.1	change in profits per hour worked [EUR/h]
B4	change in number of new companies in affected region [1/a]	
	C4.1	venture capital for tech startups [EUR]
B5	change in median income of households in affected structural-weak regions [%]	
	C5.1	change of profits from digital services of company [EUR]
	C5.2	change of median income of workers in the company [EUR]

5.4 Access to Essential Services: Health

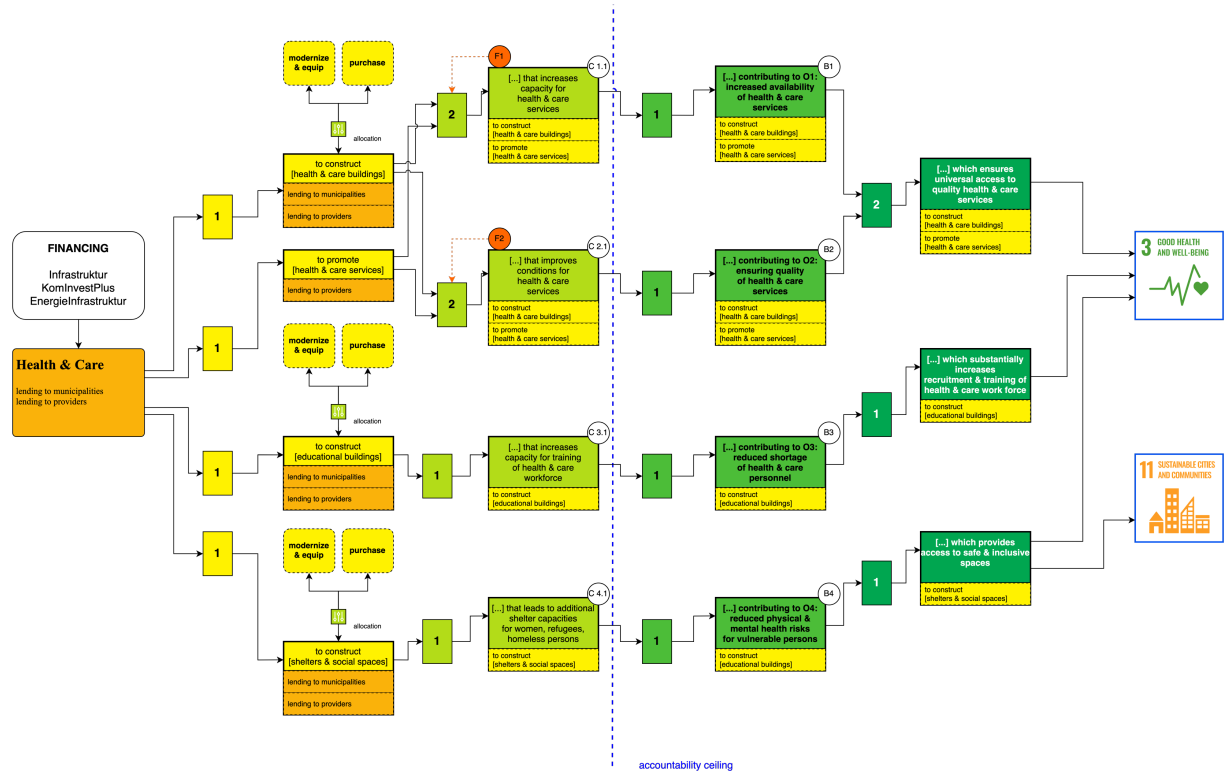
5.4.1 Hypotheses

Pathway	Hypotheses to be investigated (activities Outputs intermediate Outcomes long-term Outcomes IMPACTS pre-conditions hazards potential rebounds)
O1	<p>The NRW.BANK loans for health & care infrastructures can lead to increased capacities for health & care services via investments into new buildings or additional health & care infrastructures and promoting health & care services directly by providers. This ensures universal access to quality health & care services (SDG 3: GOOD HEALTH & WELL-BEING) if it contributes to increased availability of health & care services as a consequence. This outcome can be reduced, if this entails an over-supply of these services in these regions and thus leads to unnecessary operating costs.</p> <p>No additional pre-conditions have to be met.</p>
O2	<p>The NRW.BANK loans for health & care infrastructures can lead to improved conditions for health & care services via investments into new buildings or additional health & care infrastructures and promoting health & care services directly by providers. This ensures universal access to quality health & care services (SDG 3: GOOD HEALTH & WELL-BEING) if it contributes to ensuring a high quality of health & care services as a consequence. This outcome can be reduced, if this entails an increase in service costs from higher costs by providers.</p> <p>No additional pre-conditions have to be met.</p>
O3	<p>The NRW.BANK loans for health & care infrastructures can lead to increased capacities for training the health & care workforce via investments into new buildings for the education of this personnel by communities and providers. This substantially increases the recruitment & training of the health & care workforce (SDG 3: GOOD HEALTH & WELL-BEING) in a region if it contributes to a reduced shortage of such personnel as a consequence.</p> <p>This outcome is conditioned on ensuring adequate training standards by the teaching facilities as well as the regulator.</p>
O4	<p>The NRW.BANK loans for health & care infrastructures can lead to additional shelter capacities for women, refugees, and homeless persons via investments into new buildings for shelters and social spaces by communities and providers. This provides safe & inclusive spaces (SDG 11: SUSTAINABLE CITIES & COMMUNITIES) in a region if it contributes to reduced physical and mental risks for vulnerable groups as a consequence.</p> <p>This outcome is conditioned on ensuring adequate financing of the provider's operating costs by communities and the regulator.</p>

5.4.2 Outcome-Pathways

There are 4 outcome-pathways towards 2 overarching goals preceded by 4 predicted outputs. Each output functions as a cause for each of these outcomes, whereas 2 intermediate Outcomes jointly contribute to one long-term Outcome and the remaining 2 intermediate Outcomes are paired up with their long-term counterparts.

Theory of Change - Access to Essential Services: Health



5.4.3 Potential Indicators

We identify 4 *best-needed* indicators for intermediate Outcomes (quality B) and 4 *best-needed* indicators for Outputs (quality C). The following table lists these indicator suggestions.

Pathways	Indicator Suggestion	
B1	change in number of available beds (care facilities/hospitals) per 1,000 residents [%]	
	C1.1	increase in number of available places (care facilities/hospitals) [1/a]
B2	change in satisfaction with health & care services [%]	
	C2.1	decrease in time between notification and treatment/service [h/a]
B3	change in number of health & care workers per 1,000 residents [%]	
	C3.1	increase in number of health & care workers in training [1/a]
B4	change in excess mortality from mental & physical health issues [%]	
	C4.1	increase in number of places in shelters [1/a]

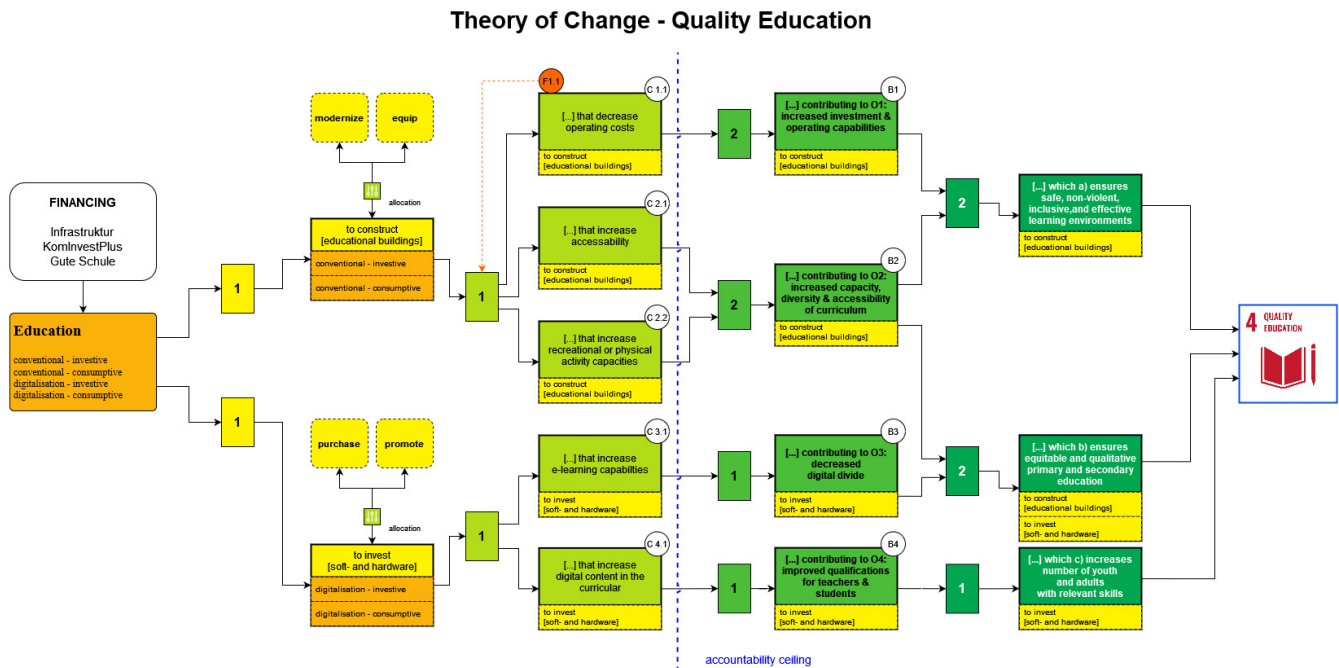
5.5 Access to Essential Services: Education

5.5.1 Hypotheses

Pathway	Hypotheses to be investigated (activities Outputs <i>intermediate Outcomes</i> longterm Outcomes IMPACTS <u>pre-conditions</u> hazards <i>potential rebounds</i>)
O1	<p>The NRW.BANK loans for educational purposes lead to decreased operating costs via energy-efficient modernization of educational buildings. This ensures safe, non-violent, inclusive and effective learning environments (SDG 4: QUALITY EDUCATION) if it contributes to increased investment and operating capabilities as a consequence. This outcome can be reduced, if the additional investments by the borrowers reduce future investment capabilities (e.g., from interest or equity requirements in the loan program).</p> <p>This outcome is conditioned on <u>maintaining future investment capabilities despite current expenditures</u> of the affected educational entities.</p>
O2	<p>The NRW.BANK loans for educational purposes lead to increased accessibility as well as additional recreational and physical activity capabilities via the construction and modernization of educational buildings. This ensures safe, non-violent, inclusive, and effective learning environments as well as equitable and qualitative primary and secondary education (SDG 4: QUALITY EDUCATION) if it contributes to an increased access to new and beneficial educational offers as a consequence.</p> <p>No additional pre-conditions have to be met.</p>
O3	<p>The NRW.BANK loans for educational purposes lead to increased e-learning capabilities via the investment in soft- and hardware for digitalization. This ensures equitable and qualitative primary and secondary education (SDG 4: QUALITY EDUCATION) if it contributes to a smaller digital divide between different social groups as a consequence.</p> <p>No additional pre-conditions have to be met.</p>
O4	<p>The NRW.BANK loans for educational purposes lead to increased digital content in the curriculum via the investment in soft- and hardware for digitalization. This increases the number of youth and young adults with relevant skills (SDG 4: QUALITY EDUCATION) if it contributes to improved qualifications for students and teachers as a consequence.</p> <p>No additional pre-conditions have to be met.</p>

5.5.2 Outcome-pathways

There are 4 outcome-pathways linked to 5 predicted distinct outputs. Each output function as a cause for only one of these outcomes, whereas one short-term outcome contributes to more than one long-term outcome (of which there are 3). The outputs are linked to only 2 types of activities on the side of the positioned interventions.



5.5.3 Potential Indicators

We identify 4 *best-needed* indicators for intermediate Outcomes (quality B) and 5 *best-needed* indicators for Outputs (quality C). The following table lists these indicator suggestions.

Pathways	Indicator Suggestion [P: person, trainee or student or child]	
B1	change in annual investments [EUR/a]	
	C1.1	change in operating costs per person [EUR/P]
B2	change in minimum attendance [h/a*P]	
	C2.1	change in number of enrolled disadvantaged persons [1]
B3	change in number of persons with robust digital skills [1]	
	C3.1	change in number of persons attending classes with e-learning tools [1]
B4	change in self-assessed qualification of persons [evidential]	
	C4.1	change in share of digital content in curriculum [%]

5.6 Access to Public Goods and Services

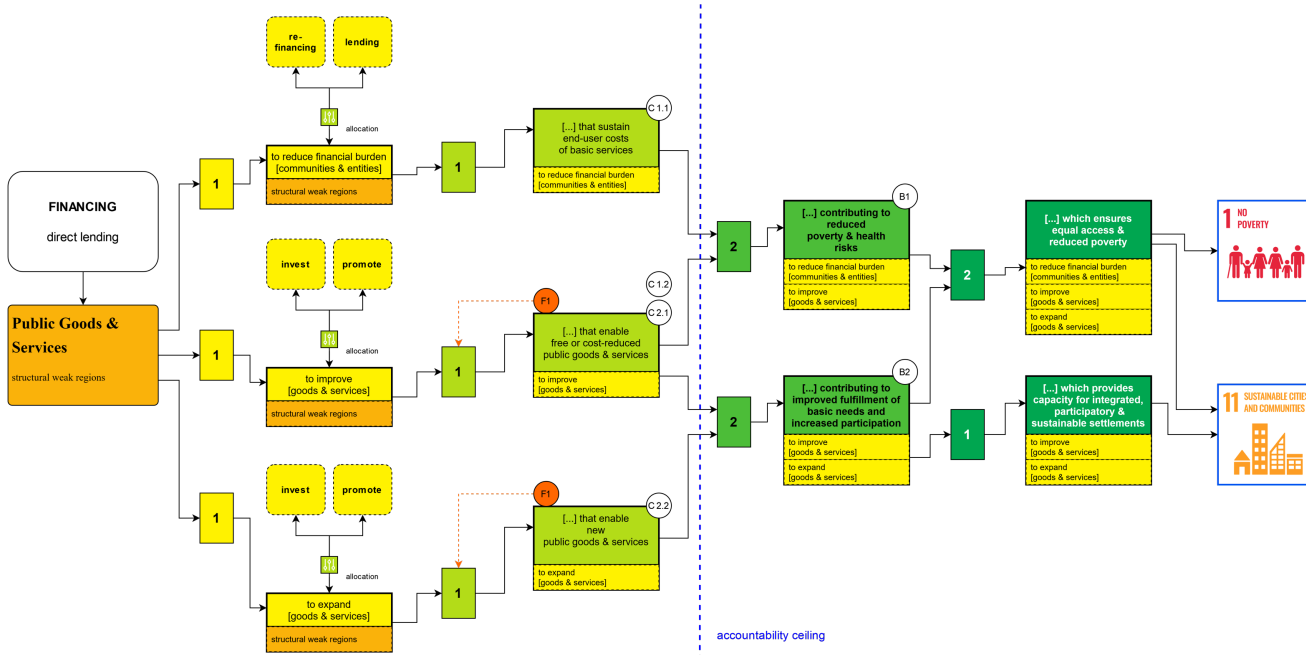
5.6.1 Hypotheses

Pathway	Hypotheses to be investigated (activities Outputs intermediate Outcomes longterm Outcomes IMPACTS pre-conditions hazards potential rebounds)
O1	<p>The direct lending of NRW.BANK to municipalities in structural weak regions can sustain end-user costs of basic services or enable free or cost-reduced public goods & services via reducing the financial burden of those communities and their entities and improving goods & services. This ensures equal access & reduced poverty (SDG 1: No POVERTY) if it <i>contributes to reduced poverty & health risks</i> as a consequence. The second outcome (free or cost-reduced goods & services) can be reduced if meeting the demands for re-financing reduce opportunities for additional non-mandatory investments.</p> <p>This outcome is conditioned on <u>ensuring that structural-weak communities benefit from favorable lending conditions</u>.</p>
O2	<p>The direct lending of NRW.BANK to municipalities in structural weak regions can enable free or cost-reduced or additional public goods & services via improving or expanding goods & services. This ensures equal access & reduced poverty (SDG 1: No POVERTY) if it <i>contributes to reduced poverty & health risks</i> as a consequence. It also provides capacities for integrative, participatory, and sustainable settlements (SDG 11: SUSTAINABLE CITIES & COMMUNITIES) if it <i>contributes to the improved fulfillment of basic needs and increased participation</i> as another result. Both outcomes can be reduced if meeting the demands for re-financing reduce opportunities for additional non-mandatory investments.</p> <p>This outcome is conditioned on <u>ensuring that structural-weak communities benefit from favorable lending conditions</u>.</p>

5.6.2 Outcome-Pathways

There are 2 outcome-pathways towards 2 overarching goals preceded by 3 predicted outputs. 1 Output (free or cost-reduced services) contributes to 2 pathways, whereas the remaining Outputs contribute to each of the outcomes separately. 1 intermediate Outcome contributes solely to SDG 11 via 1 longterm Outcomes, while SDG 1 benefits from both intermediate Outcomes.

Theory of Change - Access to Public Goods & Services



5.6.3 Potential Indicators

We identify 2 *best-needed* indicators for intermediate Outcomes (quality B) and 4 *best-needed* indicators for Outputs (quality C). The following table lists these indicator suggestions.

Pathways	Indicator Suggestion	
B1	change in household expenditures for public goods & services [%]	
	C1.1	change in costs for public services [EUR]
	C1.2	change in number of free services [1]
B2	change in household satisfaction with public services & goods [%]	
	C2.1	change in number of services with reduced costs [1]
	C2.2	change in number of additional services [1]

5.7 Disaster Management

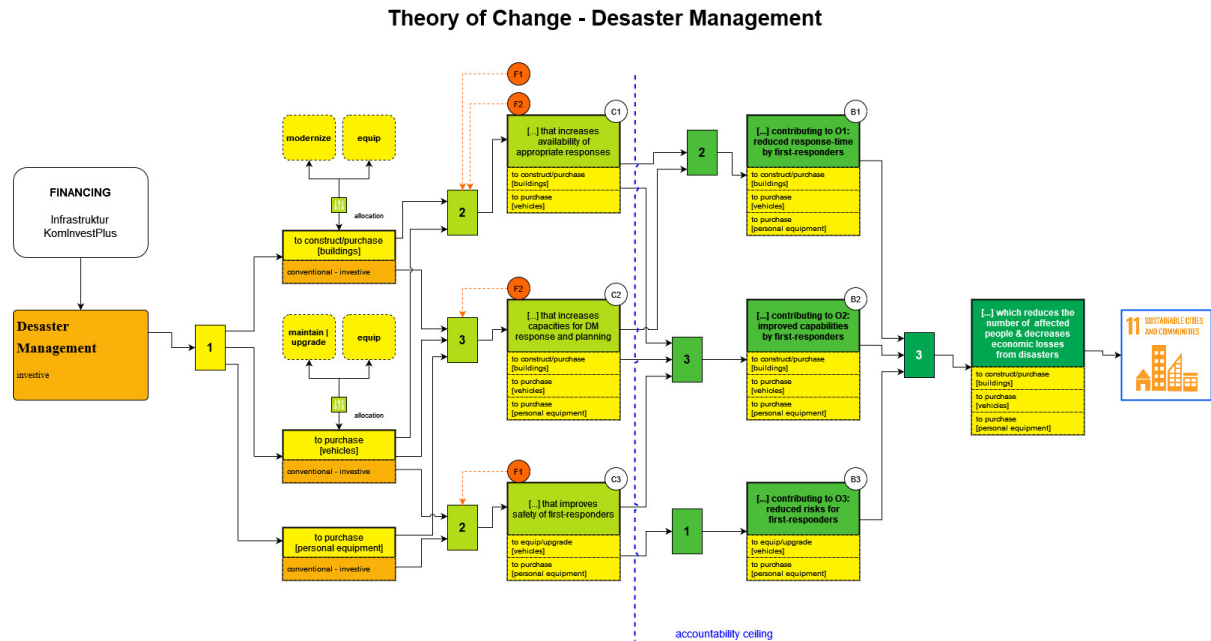
5.7.1 Hypotheses

Pathway	Hypotheses to be investigated (activities Outputs intermediate Outcomes longterm Outcomes IMPACTS pre-conditions hazards potential rebounds)
O1	<p>The NRW.BANK loans for disaster management can lead to an increased availability of appropriate responses to disasters as well as to increased capacities for disaster response management and planning via investments into new buildings, vehicles, and equipment for first-responders*. This reduces the number of affected people and decreases the economic costs from disasters (SDG 11: SUSTAINABLE CITIES & COMMUNITIES) if it contributes to reduced response-times as a consequence. This outcome can be reduced, if the first-responders are not appropriately trained and if the current and future needs for certain disaster responses are not considered during investment.</p> <p>This outcome is conditioned on <u>maintaining future investment capabilities</u> by the affected communities.</p>
O2	<p>The NRW.BANK loans for disaster management can lead to an increased availability of appropriate responses to disasters as well as to increased capacities for disaster response management and planning via investments into new buildings, vehicles, and equipment for first-responders*. This reduces the number of affected people and decreases the economic costs from disasters (SDG 11: SUSTAINABLE CITIES & COMMUNITIES) if it contributes to improved capabilities by first-responders as a consequence. This outcome can be reduced, if the first-responders are not appropriately trained and if the current and future needs for certain disaster responses are not considered during investment.</p> <p>This outcome is conditioned on <u>maintaining future investment capabilities</u> by the affected communities.</p>
O3	<p>The NRW.BANK loans for disaster management can lead to improved safety for first-responders* via investments for the acquisition of personal equipment. This reduces the number of affected people and decreases the economic costs from disasters (SDG 11: SUSTAINABLE CITIES & COMMUNITIES) if it contributes to reduced risks for first-responders as a consequence. This outcome can be reduced, if the first-responders are not appropriately trained.</p> <p>This outcome is also conditioned on <u>sufficient training capacities for both professional and volunteer first-responders</u> by the affected communities.</p>

* The term first-responder is used as a generic description for all personnel that is involved in the planning, management, or execution of disaster responses. Such persons can be employed by communities, but do not have to be (e.g., volunteer fire-fighters).

5.7.2 Outcome-Pathways

There are 3 outcome-pathways linked to 3 predicted distinct outputs. Each output functions as a cause for 2 of these outcomes, whereas all short-term outcomes contribute to the same single long-term outcome. The outputs are linked to 3 types of activities on the side of the propositioned interventions, of which at least 2 are present in each outcome-pathway.



5.7.3 Potential Indicators

We identify 3 *best-needed* indicators for intermediate Outcomes (quality B) and 5 *best-needed* indicators for Outputs (quality C). The following table lists these indicator suggestions.

Pathways	Indicator Suggestion	
B1	change in average response-time in affected community [%]	
	C1	change in average travel-time for response [%]
	C2	change in number of first-responders per event [%]
B2	change in number of events that can be managed at the same time [%]	
	C1	change in average travel-time for response [%]
	C2	change in number of first-responders per event [%]
	C3	change in (self-assessed) adequacy of equipment for first-responders [qualitative]
B3	change in number of response-related injuries [%]	
	C3	change in (self-assessed) adequacy of equipment for first-responders [qualitative]

6 Contribution, Attribution and Additionality of NRW.BANK Social Bonds

6.1 Contribution and Attribution

Recent studies have questioned the credibility of sustainability claims by issuers of Social, Sustainability, or Green Bonds. It is argued that the expectations of investors cannot be met in regard to their understanding how the funds are spent, how the funds lead to new projects and how these investment strategies might make it harder for non-sustainable players to obtain capital (Krahn et al., 2021). And there is no doubt that some of these products can be considered a *rebranding without additionality*. One indication for this issue is the higher growth rate of these financial products compared to the growth rate of overall investments into sustainable sectors (Migliorelli, 2021).

While the question of segregation and diverted "brown" assets can only be answered for the market as a whole, the two claims regarding *Attributability* and *Additionality* can be investigated within the framework of a particular bond. However, we first need a working definition of sustainable finance that can be applied to the bond. We use Migliorelli's (2021, p. 10) definition of *finance for sustainability* for that purpose: "*finance to support sectors or activities that contribute to the achievement of, or to the improvement in, at least one of the relevant sustainability dimensions*".

In the case of the NRW.BANK loans, two statements hold true that indicate that investments here actually lead to desired societal effects and can be considered a *Contribution* and thus also an *Attribution*.

First, we look at the issuers' role in the region. NRW.BANK is the promotional bank of the State of NRW for the completion of its' structural and economic policy tasks. It is limited to the three promotion areas of "economy", "housing" and "infrastructures/municipalities" and a full set of sustainability guidelines is in place (exclusion criteria). There is also a "not paying out dividend" policy in place. Earnings are only used to strengthen the reserves.

Secondly, the issuer clearly states in his framework: "*An amount equivalent to the net proceeds raised from any NRW.BANK Social Bond/CP issued under this Framework will be allocated, in part or in full, to finance new eligible social expenditures ("Eligible Social Projects") and/or to refinance existing Eligible Social Projects whose disbursements occurred no earlier than 36 months prior to the issuance year*" (NRW.BANK, 2022, p. 7).

These two facts, in addition to the impact assessment by the authors, provide a plausible rationale for contributions by the NRW.BANK to desired outcomes and thus attributions by the issuance of its Social Bonds. The framework ensures that at least parts of future funds as well as net proceeds will be allocated to the same type of eligible social projects. The role of the issuer and his sustainability guidelines also ensure that the remaining funds have no risk of an un-sustainable materialization.

6.2 Additionality

One can also consider the role of the issuer as a promotional bank for the State of NRW (see Teubler et al. (2022) for recommendations (in German) regarding the future evolution of the NRW.BANK towards a "transformational bank"). Some capital provided is the result of policies on the State or federal level. This can sometimes result in "free" capital (grants), but mostly translates into favorable financing conditions for either the direct beneficiary or the associated business partners from the private banking sector that benefit from lower risks.

I distinguish four types of capital for the purpose of evaluating the *Additionality* of Sustainable Finance defined by Anderson (Andersen et al., 2021, p. 9) as: "*Financial additionality refers to situations where finance is mobilized and an investment is made that would not have materialized otherwise*".

First, any financing that is required by beneficiaries but could be provided by almost any player in the market is defined as *conventional financing*. That is, the capital contributes to desired changes but does not do so in a manner deemed to be additional.

Secondly, any capital that is not needed at all, is in fact *dead-weight financing*. Strictly speaking, such capital does not meet the threshold of even a contribution to the desired changes.

The third category refers to capital that is not only required, but in fact sufficient for desired outcomes. This means that in any other possible world (all other things being equal) the outcome would not have been achievable without the capital by a specific actor. A typical application of this category of *consequential financing* relates to venture capital for start-ups (which would probably not have gone off the ground without such investments).

The fourth and final type of financing is the category of *favorable financing*, which comprises of all types of loans with well-below market conditions. These conditions could involve unusual low interest rates (e.g., from state-promoted housing programmes), lower requirement for equity or better conditions for repayments. As a result, either additional outcomes could be achieved with the same financial burden, or the same outcomes could be achieved with a lower financial burden.

There is evidence that NRW.BANK, and some of the associated loan categories in its Social Bonds, constitute such favorable financing. One example for that is already included in the current impact assessment of the bond. About 2% of the loans in the category of SME financing involve a partial release from reliability for the "house banks" of the companies. Banks are obliged to proportion loan conditions to the risks of default. Since a partial release from reliability does in fact lower these risks (at higher risks for NRW.BANK), they are thus able to provide favorable conditions to the beneficiaries (in this case SMEs in the State of NRW).

Future iterations and updates of this method paper, as well as the resulting impact assessment, will integrate such considerations into the methodology. The aim is to provide additional information to investors (and other interested parties) on how some of the financing by NRW.BANK is additional, and thus also additional regarding reported impacts from its Social Bonds.

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