7 Implementation strategies for climate change adaptation measures in Dutch social housing

After two parallel research lines - one on housing associations and their knowledge and awareness of climate change and the other on partnering in construction - Chapter 7 brings both these lines together. In this chapter three conceptual approaches are developed that aim to provide a solution to barriers to the implementation of climate change adaptation measures by housing associations, as outlined in Chapters 3 and 4. Two of the three conceptual approaches are derived from the principles of partnering in construction that were the subject of Chapters 5 and 6.

The paper was presented at the CIB 2014 Conference in Kandalama, Sri Lanka, and published in its proceedings as: Roders, M., & Straub, A. (2014). Scenarios for effective climate change adaptation in Dutch social housing. In D. Amaratunga, R. Haigh, L. Ruddock, K. Keraminiyage, U. Kulatunga & C. Pathirage (Eds.) *Proceedings of the CIB International Conference 2014*: W55/65/89/92/96/102/117 & TG72/74/81/83 Construction in a Changing World, (pp. 1-12). Salford: The University of Salford.

Abstract

Housing managers are constantly confronted with the changing demands and requirements that their building stock must meet. One aspect of this is the changing climate, which is caused primarily by greenhouse gases produced by human activities. Even if the emissions of all these gases could now somehow be put on hold, the process of climate change could not be, and the effects of climate change would most probably continue to be felt for many more years. In urban areas, these effects include drought, flooding caused by extreme precipitation and heat stress caused by the urban heat island effect. In addition to threatening the building stock, climate change is also threatening the quality of life of people in urban environments. In the Netherlands, housing associations are responsible for managing the social housing stock and maintaining the quality of life of those that live there. However, research has shown that they are not yet sufficiently aware of the challenge that lies ahead in adapting their dwellings to a changing climate. In view of the focus on the physical adaptations of the building stock, it was chosen to discuss in this paper the effectiveness of three types of conceptual approaches for governance that housing associations could apply directly in their maintenance processes. The conceptual approaches are hypothesised based on the results of earlier research on the implementation of climate change adaptations in

social housing. The conceptual approaches are: CA1) incorporate climate adaptation into the policy that guides the overall management of their stock; CA2) involve actors that traditionally do not play a role in the construction process, such as insurance companies and water boards; CA3) emphasise performance-based procurement to encourage the execution of projects using a partnering approach. The effectiveness of these conceptual approaches was tested using a SWOT analysis for each approach, which was discussed with practitioners. The results are five implementation strategies, based on the combinations of conceptual approaches that are potentially feasible for the implementation of climate change adaptation measures in the Dutch social housing stock. One crucial factor in these implementation strategies is collaboration, because these days no housing association is financially able to assume responsibility for climate-proofing its housing stock on its own.

Keywords: Adaptation, Climate Change, Construction Process, Policy Development, Social Housing

§ 7.1 Introduction

There is clear evidence that the world's climate is changing (Füssel, 2009; Smith *et al.*, 2009). Phenomena such as urban heat islands (Salcedo Rahola, 2009) and flooding, caused by more intense precipitation and increased river run-off, are expected to become more frequent (Bessembinder, 2008), posing a threat to quality of life in cities. As we gain more knowledge about the effects of climate change, both behavioural and physical adaptation measures have been developed to address these effects, resulting in guidelines for citizens on how to behave during heat waves (see for example: MinHWS, 2007; Oakman *et al.*, 2010; Department of Health, 2012), as well as design recommendations for the urban environment such as green roofs for temporary water retention (see for example: GLA, 2005).

In 2012, the Delta Programme New Urban Developments and Restructuring published a 'measure matrix' for the Netherlands that listed 155 adaptation measures for the built environment (MWH, 2012). Housing associations are significant actors when it comes to applying adaptation measures in housing. A relatively small number of organisations (381) own and maintain approximately one third (2.4 million) of the total housing stock of the Netherlands (www.cfv.nl), so, if these associations were to decide to adapt their dwellings, a large part of the country's stock could be made more resilient to the effects of climate change. However, a recent study of documents published by housing associations showed that they have only a limited awareness of how to apply climate change adaptation measures (Chapter 3 of this thesis). What is

more, policy-makers at housing associations have shown in interviews that even when they are aware of adaption measures, implementation is unlikely because of financial constraints, the absence of a policy, or the measures being viewed as too complex to implement (Chapter 4 of this thesis). This implies that housing associations are not planning structural alterations that could mitigate the harmful effects of climate change. There are various reasons why they should start to adapt their dwellings, however. First of all, housing associations can be considered 'social entrepreneurs', deploying their resources and profits to achieve the societal aims that they pursue (Van Overmeeren, 2014). Secondly, housing associations have a legal obligation to provide good quality housing for their tenants both now and in the future according to the Social Rented Sector Management Order (MinIKR, 2005). The societal and legal framework within which housing associations operate implies that they can be expected to commit themselves to adapting their dwellings to changing circumstances that may threaten the quality of life of those living there. Climate change is one of those threats. Thirdly, the failure to implement adaptation measures could jeopardise the future value of their stock, because in the Netherlands dwellings in areas with a risk of flooding have a lower average value than dwellings in a non-risk area (Bosker *et al*., 2013).

The aim of this paper is to identify approaches to increase the implementation of climate change adaptations, in order to end up with a climate-resilient dwelling. The study looks at housing associations, as major property owners, as the main actor in this process, and the underlying question is how to implement these measures effectively. As such, the study is not focusing on governance schemes initiated by the government which instruct, encourage or oblige housing associations to take action, in hierarchic, market or network settings (Chapter 2 of this thesis), since these schemes are still under development. In addition, if the government forces the housing associations to take action, the disadvantage is that these housing associations would have to develop internal governance schemes to begin adapting dwellings and to request adaptations to the construction sector. This implies governance measures at three levels, the first from the government to housing associations; the second from the policy department to the project planning department and the third from the planning department to the construction sector to carry out the works. The focus directly on the governance level of the construction sector is expected to lead to a more effective implementation of measures. Moreover, knowledge gaps can be identified on which the government should focus its national governance strategies. To do this, a closer look at the maintenance and improvement cycle for existing dwellings is needed to find opportunities for the implementation of measures.

In the following sections, the methodology will be described that has been used to carry out this research. Then, the results will be presented and discussed, and finally conclusions will be drawn and with some remarks and recommendations for further study will be given.

§ 7.2 Methodology

Potentially successful conceptual approaches were hypothesised based on and inspired by the results and experiences of previous studies (Chapters 3 and 4 of this thesis), conference visits and research project meetings attended by the researchers. The basis for these conceptual approaches was that a governance intervention at several phases in the maintenance and construction cycle of a dwelling should lead to the implementation of measures. The first conceptual approach (CA1) was hypothesised as follows: housing associations should incorporate climate change adaptation as an internal policy, meaning that they should allocate resources to this area and include adaptations in their projects. In earlier interviews (Chapter 4 of this thesis), employees of housing associations stated that the lack of policy is one of the reasons why they do not implement measures. The hypothesis underlying the second conceptual approach (CA2) was as follows: housing associations should seek collaboration with actors who might also benefit from the adoption of climate adaptation measures, such as municipalities and insurance companies. In cases where housing associations implement water-retention or infiltration measures, under the terms of the cooperation agreement, the municipalities in question may spend less on adapting the sewage system. The third conceptual approach (CA3) was hypothesised as follows: housing associations should aim for a partnering approach with construction companies to carry out construction work. Partnering promises to be a more cost-effective way of working (CII, 1991), which would create the scope for investing in adaptation measures.

The strengths, weaknesses, opportunities and threats (SWOTs) of these conceptual approaches were discussed and verified in face-to-face interviews with practitioners in each strategic field. The practitioners that were consulted are listed in Table 7.1. The results of the SWOT analysis were used to develop strategies on the effective implementation of climate change adaptation measures.

PRACTITIONER FUNCTION	STRATEGY	ORGANISATION
Senior advisor, property management	S1. Policy development	Housing association (56,000 dwellings)
Director, property management	S1. Policy development	Housing association (77,000 dwellings)
Director, property management	S1. Policy development	Housing association (30,000 dwellings)
Director	S2. External actor involvement	Centre of expertise sewer management and urban drainage
Strategic advisor	S2. External actor involvement	Water company
Senior advisor, water systems	S2. External actor involvement	Water board
Strategic advisor, long-term policy	S2. External actor involvement	Federation for health insurers
Senior advisor, risk management and reinsurance	S2. External actor involvement	Insurance company
Policy advisor	S2. External actor involvement	Insurance company
Employee Development and Maintenance Sewage systems	S2. External actor involvement	Municipality
Director	S3. Partnering approach	Construction company (300 employees)
Director	S3. Partnering approach	Construction company (45 employees)

TABLE 7.1 Interviewed practitioners

§ 7.3 Effectiveness on climate change adaptation

CA1. Policy Development. In earlier research carried out by the current authors, it was concluded that awareness of the need for climate change adaptation was lacking in policy documents published by Dutch housing associations (Chapter 3 of this thesis). As a consequence, there is no policy that guides the implementation of climate-change adaptation measures. According to the definition of 'policy-making' used by several scholars (see Dankert, 2011), which states that under a policy strategy goals are established and the resources needed to reach those goals are allocated, the absence of a policy strategy implies that no financial resources have been allocated for climate-change adaptation measures. However, even if housing associations are aware of the need for climate change adaptations and developing policy strategies for their implementation, little money is currently available (Nieboer and Gruis, 2014). So if the government were to put in place governance arrangements in the fields of regulation and information in order to oblige the housing associations to implement such measures, the housing associations would have to reallocate resources from other policy fields in order to implement any such adaptation policy. This could lead to lower

quality in other areas, which is not desirable. Further funding from government is not possible either, due to a lack of resources. Nevertheless, the potential for developing a policy to allocate resources to the field of climate-change adaptation and the associated decision framework for action is a strategy worth investigating.

CA2. Involving external actors in the construction process. A second arrangement is reforming the plan development process to generate funding for climate-change adaptation measures. This arrangement would focus on actors that could benefit financially from such initiatives. Given that a water-resilient dwelling, for example, is less likely to suffer damage due to flooding, insurance companies would incur lower risks. They would save money, which may mean that they would be willing to invest in adaptation measures. The money could be paid directly to the owner of the dwelling, or the insurance premium could be reduced so that the homeowner could use that money for adaptations. (McEvoy, 2010; CEA, 2007). Other beneficiaries of flooding adaptation measures would be municipalities, because there would be less need to adapt their sewage systems and water authorities, since they would not need to change their drainage systems, water cleaning plants and pumping stations. The water volume that they deal with now would remain the same: the increase caused by climate change would be cancelled out by adaptation measures in the urban environment.

CA3. Adopting a partnering approach for projects. Under the third type of arrangement, the focus is on removing the financial barriers that impede the implementation of measures. The solutions can be found in increasing the effectiveness of current 'traditional' construction processes. Increasing effectiveness implies lower costs for the same product, creating financial scope for investing in adaptation measures. In this thesis, the definition of partnering is used as developed by the Construction Industry Institute (CII, 1991): "A long-term commitment by two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources. This requires changing traditional relationships to a shared culture without regard to organization boundaries. The relationship is based upon trust, dedication to common goals, and an understanding of each other's individual expectations and values. Expected benefits include improved efficiency and cost-effectiveness, increased opportunity for innovation, and the continuous improvement of quality products and services". According to this definition, partnering can be considered a method of making the construction process more efficient.

§ 7.4 SWOT Analysis

In this section, the results of the SWOT analysis with the practitioners will be presented for each of the three conceptual approaches: policy development; the involvement of external actors; and carrying out the projects by using a partnering approach.

CA1. Policy Development

This conceptual approach was explored using the following question: what are the strengths, weaknesses, opportunities and threats of incorporating climate-change adaptation measures as a specific subject in (any kind of) policy documents? The arguments given by the respondents are summarised below.

Strengths: Adaptation needs to be officially incorporated into policy in order for it to be included in plan developments. A policy plan legitimises investment and sets project boundaries, indicating what should be done. A policy plan identifies a destination for the medium to long term and describes how to reach this destination, guiding decision-making at the product and process levels.

Weaknesses: A policy strategy can be perceived as a restraining, top-down management instrument. Climate change adaptation has low priority and little has been done to raise awareness among the employees and tenants of housing associations. Currently, insufficient resources are available to develop a stand-alone strategy for the implementation of adaptation measures - these must be combined with other projects.

Opportunities: Housing association policy strategies can be matched with the municipal policy strategy, thereby creating a basis for collaboration. With regard to heating, guidelines for a higher comfort level for the dwellings can be specified through policy. Policy in areas such as adaptation, mitigation, and sustainability may reveal opportunities for combining measures to achieve synergies.

Threats: Even if housing associations incorporated adaptation in their policy strategy, support for the tenants would be necessary to implement the measures. Including measures in policy documents does not necessarily mean immediate implementation because risk management and ad hoc measures to address other more pressing or unexpected issues may take a higher priority. The dwelling or plot level may not be the right level for taking measures, since it may be more effective to provide one large-scale measure in the public space.

CA2. External Actors

This conceptual approach was explored using the following question: what are the strengths, weaknesses, opportunities and threats of involving external actors in the plan developments? The arguments, as stated by the interviewees, are summarised below.

Strengths: Collaboration with external actors such as municipalities and water boards may lead to greater efficiency in the development process, because these actors could notify the housing association at an early stage if a project does not meet legal requirements. Housing associations and municipalities would both benefit from a healthy living environment as a result of the adaptation measures. Housing associations and insurance companies would both benefit from the prevention of damage as a result of the adaptation measures.

Weaknesses: If a housing association collaborates with a water board, the housing association would become partially responsible for water-related issues that do not fall within its area of expertise. There is no market for rain insurance for housing associations, because they do not feel it necessary to cover the risk of damage to the structure of the dwelling (they do insure against fire and storm damage). There would be no urgent need for health insurers to become involved with the implementation of climate change adaptations since their main focus is on providing good care after a person becomes ill, not on preventing illness. Moreover, it is difficult to prove a direct relationship between applying measures to dwellings that may help to prevent illness, when other measures, such as ensuring that elderly people drink enough, could prove much more effective.

Opportunities: Implementing adaptation measures that reduce the impact on the sewage system could result in lower sewer taxes. Adaptation measures could be mainstreamed at a neighbourhood level through initiatives such as the circular economy and the implementation of mitigation measures, thereby involving more stakeholders in the project and generating more support among local residents. The different actors would have to collaborate to share tasks and responsibilities because the measures at the building and neighbourhood level would have to be matched.

Threats: Many measures would certainly cost extra money, while in many cases revenues are uncertain. Water boards and municipalities only have public money, which they could not freely spend on the private property of housing associations. Municipalities cannot fully apply their knowledge in housing association projects since they feel they are perceived more as controlling authorities than as partners. Insurance contracts with housing associations are relatively short (1-3 years), which for insurance companies implies the risk that they would not stand to gain from their contribution to adaptation measures if the housing association decided to switch insurance company.

CA3. Partnering Approach

This conceptual approach was explored using the following question: what are the strengths, weaknesses, opportunities and threats of adopting a partnering approach? The following arguments were given by the interviewees.

Strengths: Practical knowledge about technology can be applied early in the development of the plans. The housing association allocates construction risks to its partners in the supply chain during the implementation of the project. Repeating processes with the same partners could reduce costs and also improve quality.
Weaknesses: The 'ultimate' market test, selecting from competitive alternatives with respect to price and/or quality, is not possible. It is uncertain whether the best solution offered by the partnering consortium is also the best solution overall. Current partnering models focus on relationships between housing associations and construction companies, while most of the potential for innovation lies with manufacturers. The strategies and processes of housing associations are a blind spot for construction companies, because they are accustomed to working in a solution-driven environment.
Opportunities: Sub-optimal solutions could be prevented by aligning the goals of the partners and parties from outside the partnership. Within the supply chain, knowledge would be freely available for all parties. Partnering could prevent the waste of public money, because partners would take a longer-term view, while in market-driven environments the short-term solution will often prevail.
Threats: In a partnering setting, the spread of risks is lower because much of the work is done by one consortium. Reliance on the partnering consortium can become too great and control by the housing association may decrease. Once they have been awarded a long-term contract, the partners in the consortium may become less motivated to continuously improve their service.

§ 7.5 Discussion

The next step in this study was to develop feasible strategies for the implementation of climate change adaptation measures to dwellings. The researchers evaluated the feasibility of the implementation strategies by asking whether they were likely to lead to the implementation of measures, in light of the results of the SWOT analyses.

One strategy was based on the conceptual approach of policy development (CA1): *The housing association incorporates the implementation of adaptation measures into its policy, allocates resources for adaptation and prescribes exactly what has to be done by the construction company.*

The positive argument for this strategy is the fact that a change in policy takes place, bringing into play the strengths and opportunities of policy-making as outlined above. However, certain weaknesses and threats cannot be avoided – financing the measures in particular. This could be done by teaming up with external actors, for example, who may be willing to contribute financially to the measures because they would profit from the measures as well. The financial barriers could also be removed by adopting a partnering approach and challenging the supply chain to deliver adaptation measures at a lower price, making the most of the benefits of a more efficient planning process. However, since this strategy only deals with policy-making and neither external actors nor other partners would necessarily be involved, the weaknesses are too significant to consider the strategy feasible. Likewise, the strategies based solely on involving new actors (S2) and on a partnering approach (S3) are not feasible, because the weaknesses would be too great or insufficiently avoidable.

Potentially more feasible are the implementation strategies based on combining two conceptual approaches:
Implementation strategy A (CA1+CA2): The housing association incorporates the implementation of adaptation measures into its policy, allocates money to carry out these measures and seeks to collaborate with an external actor (e.g. municipality, water authority, insurance company) to develop and realise the project together with that actor with the aim of pursuing shared goals.
Implementation strategy B (CA1+CA3): The housing association incorporates the implementation of adaptation measures into its policy, allocates money to carry out these measures and forms a partnership with one or more construction supply chains for all the renovation work on its building stock. The delivery of climate-change resilient dwellings is set as the performance indicator. The supply chains develop specialist knowledge of adaptation measures and apply this knowledge in the design of the project.
Implementation strategy C (CA2+CA3): A construction company works with an external actor (e.g. municipality, water authority, insurance company) and proactively incorporates adaptation measures into a project for a housing association, without the housing association having requested any adaptation measures. Together with supply chain partners and external actors, the construction company looks for solutions that fit into the project boundaries that are defined by the housing association.

Combining two conceptual approaches makes the implementation strategies more feasible. For example, in implementation strategy A, the financing weakness of policy making by the housing association remains, but in the scenario the strengths regarding collaboration with municipalities and insurance companies counteract this weakness because money can be saved on sewage tax, resulting in more investment capacity. In addition, the weakness of policy being perceived as a top-down imposition would be less important, since there would also be pressure from external actors to work on adaptation. In other words, the weaknesses are no longer decisive. The same type of benefits can be distinguished for implementation strategies B and C.

What is even more feasible is combining all three conceptual approaches:
Implementation strategy D (CA1+CA2+CA3): The housing association incorporates the adaptation measures into its policy, allocates money for implementing these measures and seeks to collaborate with an external actor (e.g. municipality, water authority, insurance company) to develop and realise the project together on the basis of shared goals. The project is handed over to a consortium with which the housing association has a partnering agreement. The delivery of climate-change resilient dwellings is set as a performance indicator.
Under this implementation strategy, the challenge of implementing climate change adaptation measures is taken up from three sides, and there is more flexibility to work around the weaknesses and threats. However, since both the second and third conceptual approaches imply the involvement of extra parties, the risk of developing a project with both external actors and a partnering consortium may lead to difficulties (Provan and Kenis, 2007) due to the large number of parties involved, persistent communication problems, the need to reconcile numerous divergent goals, etc.
In the SWOT interviews with the practitioners from the housing associations, an argument was raised that did not really belong to any of the strategies outlined at the start of this study. The interviewees stated that tenants are the most important stakeholders that a housing association works for, and it is the societal task of the housing association to meet their needs in the best possible way. Accordingly, housing associations are sensitive to tenant requests. If tenants really feel the need for a measure, it is likely that they would accept a slight increase in rent to cover the cost of investing in the adaptation measure. A fifth implementation strategy was developed, putting the occupants of the dwelling in a central position.
Implementation strategy E: The housing association and/or an external actor (e.g. municipality, water authority, insurance company) inform(s) tenants to make them aware of the benefits (more comfort, lower insurance risk) of an adapted dwelling. The tenants ask the housing association to take action, as a result of which the housing association incorporates climate-change adaptation measures into its policy.

§ 7.6 Conclusion

In this paper, three conceptual approaches for improving the implementation of climate-change adaptation measures in social housing were elaborated. The three conceptual approaches involve policy development, collaboration with external actors and using a partnering approach in the construction process. The feasibility of the conceptual approaches was verified with practitioners by means of a SWOT analysis.

The results made clear that single-pronged conceptual approaches are unlikely to be successful. This means that housing associations are currently not in the position to adapt their building stock by acting alone. It has become clear that a combination of conceptual approaches is much more feasible. A closer look at these feasible implementation strategies shows that collaboration plays an important role, as every implementation strategy includes an element of collaboration. Implementation strategy A, C and D involve collaboration with the external actors, and implementation strategy B and D involve enhancing collaboration among the partners responsible for the execution of the works. When further developing the implementation strategies, the literature on network governance will be a valuable source of reference.

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