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program cases in the MFFD research program**

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STRUGGLES AND JOY OF MULTIDISCIPLINARY COLLABORATION

PROGRAM CASES IN THE MFFD RESEARCH PROGRAM

Designing multifunctional flood defenses requires the input of knowledge from multiple disciplines, as has been frequently mentioned in this book. Researchers from multiple disciplines were employed in the MFFD-program, and they almost universally expressed a keen desire to collaborate. Different ways of collaboration were tried, explored, worked out; some were discarded as less useful, while others developed into useful products (see for example the 'MFFD-decisions' LEGO®-game and the 'Wind-turbines-on-dike' Electro®-game; p. 133).

One of the ways we stimulated multidisciplinary collaboration in the MFFD program was using what we called a 'Program Case'. This was a case study in which researchers from different disciplines worked together on one specific case location, aiming to deliver input for an integral design that addressed the specific challenges of that specific case. This sounds easy enough: look into the same case together, and deliver combined input for an integral design. This kind of collaborative work happens all the time in design, engineering and management consulting companies. Unfortunately, we learned that it can be quite difficult to achieve the same collaboration in an academic research program. Why was this so? Several issues can help to explain this:

1. Asking our researchers to share one of their individual case studies with other researchers posed the problem that it could potentially disturb carefully developed relationships. This became especially obvious in the Texas Program Case. Local contacts sometimes got confused who they were working with, and some even complained they were 'overfed' with researchers. Clearly, a Program Case with researchers from different faculties and universities needs to be managed carefully, with respect for existing and future relationships.
2. In the MFFD program, as in most academic research programs, there was hardly any time to initiate and manage collaboration activities, and the necessary expertise to do this was not provided. Conscientious Program Case management not only requires much time, but also knowledge of research and group processes, skill in managing organizations and people, and genuine engagement in and knowledge of the research topic. Postdocs are often assigned such management tasks; however, they are not selected on these skills, and as these activities do not provide material for publication, they may or often can not give this task priority. Luckily, some provision was made for this in the MFFD program, although it was by no means sufficient for all the input that the postdocs nevertheless delivered.

3. A third reason why multidisciplinary collaboration is difficult in the setting of an academic research program, is the different timelines. Not all researchers start at the same time (application and selection procedures are often not synchronous); and researchers sometimes get pregnant, sick, or decide to stop their PhD or get another job (in which case a new researcher has to start all over again). This means that researchers are often not in the same phase of research. When one researcher is looking for a case, another might still be writing their research proposal.

4. These different timelines also hinder collaborative academic publications based on the multidisciplinary Program Case: not all researchers in the group are ready to publish at the same moment. Additionally, it turned out to be extremely difficult to find the right journal for collaborative academic publications - or in some cases any journal at all. Journals from one discipline would refuse, commenting things like: 'Sorry, but this paper contains too many governance-related aspects', or 'Interesting, but this is far too planning-oriented for our readers'. Even finding a multidisciplinary journal was often problematic. For one thing, there are not many multidisciplinary journals; and secondly, those that exist are often not as highly thought of as discipline-specific journals, their readership is smaller, and their Journal Impact Factor (JIF)-scores are lower. Last but not least, working together on a publication requires far more time than working alone and requires supervising authors from the different disciplines. Co-writers always have to balance and bargain on the content of the paper, but with a co-author from another discipline, the discussions often already start on the use of certain concepts, definitions, and imagery, which can be quite different between disciplines. We discovered that for example the meaning of the words 'design', 'flood defense system', and 'multifunctional flood defense' can cause hours of discussion between researchers from hydraulic engineering, delta urbanism, multi actor governance, and landscape architecture. Co-publishing with a researcher from another discipline requires a lot of stance and sometimes even sacrifice to publish in 'less recognized' journals; and at times it turns out to be downright impossible.

5. Finally, there are time constraints. Researchers, especially PhD-students, have to finish their projects on time. In the Netherlands PhD research gets funded for a limited time, usually 4 years. Not only does each university want PhDs to finish as soon as possible (since the university gets granted about 90,000 euro for every PhD graduation), but the students themselves would rather not linger, as they will have no more income. Spending extra time on a multidisciplinary

case study that might not lead to a publication and generally takes substantially more time to conduct than an individual case study will be less popular with PhDs and supervisors alike.

Despite having encountered all these difficulties, the MFFD-research team nevertheless managed quite well, bringing two groups together and fulfill the promises made in the program proposal, sticking to the conviction that multifunctional flood defense design requires multidisciplinary knowledge and collaboration. Two Program Case studies were conducted within the MFFD research program: the Rotterdam Roof Park and the Houston Galveston Bay Region in Texas, USA.

The Rotterdam Roof Park Program Case was a retrospective case study, as the strengthening of the flood defense, the construction of the adjacent shopping mall, and the development of the park above the mall and connecting it to the flood defense, had just finished when the MFFD program started.

An urban planner, a hydraulic engineer and a landscape architect worked together to create a framework for spatial dimensions of multifunctional flood defenses, using the Roof Park as one of their cases, publishing a co-authored book chapter based on their effort (Van Veelen, Voorendt & Van der Zwet 2015). Two other researchers collaborated on evaluating and analyzing the design process and the multi-stakeholder challenges within this process, from a policy/governance and an economic/management perspective. Although they were unable to get their collaborative research outcomes co-published, both of them could use the work as a case study in their respective dissertations (Matos Castaño 2016; Hogendoorn 2017 forthcoming). And finally, another landscape architect, starting his research later, considered the visual representations of the Roof Park, adding a new perspective to the case, further enlightening the design process and the multi-stakeholder issues in a multifunctional flood defense design (Raaphorst 2017).

The second program case was the Houston Galveston Bay Region in Texas; this was based on action research. Plans for a multifunctional flood risk reduction solution for this area are still in full swing. After Hurricane Ike destroyed millions of dollars in infrastructure and left thousands of residents homeless in 2008, local universities came up with different solutions for ways to reduce future flood risk. However, a combined and unified design has still not been made. In this MFFD Program Case, engineers and the social scientists approached the problem from a systems perspective. A geographer and a policy researcher collaborated to understand the impact of political values and institutional constraints on flood risk exposure, which in turn will determine the space engineers and architects have to implement their plans (Brand & Hogendoorn 2014). A hydraulic engineer worked on optimizing an integral flood defense system from an economic perspective (Dupuits et al. 2017), and an environmental engineer considered how adding nature-based flood protection measures could enhance functions of the rural environment (Van Loon pagew 149). Finally, together with researchers from policy systems and coastal engineering, a design anthropologist, coastal engineer and systems en-

gineer co-developed a tool to include local stakeholder values in the design for multiple functions of a flood defense (Kothuis et al. 2014).

Although these studies and approaches are quite divergent, bringing all the research efforts together in this chapter shows how the MFFD program delivers an informative retrospective on the Roof Park design and useful input for future design efforts of a multifunctional flood defense system in the Houston Galveston Bay Region. This program case also led to a book, further collaboration in a research program funded by the US National Science Foundation, and several research commissions from local clients.

Over and above these accomplishments, both the researchers who collaborated in the Program Cases and the users of the knowledge developed in the case, said that not only did they learn a lot, but they also enjoyed the endeavor, considering it an enriching experience.

