

Bachelor thesis

**"Between Knowledge and Power –  
A Case Study of the Hambacher Forest Movement"**

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## **1. Abstract**

The bachelor thesis “Between Knowledge and Power – A Case Study of the Hambacher Forest Movement” answers the research question “How did the Hambacher forest movement utilize different types of knowledge to stop the deforestation in 2018?”. To answer the research question, a literature-based qualitative content analysis of the case of the Hambacher forest movement and its approach to knowledge utilization was conducted. The Hambacher forest movement was chosen due to its diversity in participants and global attention that arose in 2018 when conflicts between the social movement and RWE AG peaked. Moreover, since deforestation has been taking place since 1978 so evaluating what caused the success in 2018 is significant. This study of the social movement was conducted in consideration of the knowledge utilization framework developed by Hoffmann et al. (2019). The analysis showed that the success of the Hambacher forest movement was based in the variety of knowledge developed and the intersectional approach, which meant knowledge was utilized in the judicial, political, and public realm. Furthermore, the movement made use of intellectual and practical knowledge, which increased its impact.

## **2. Introduction**

“We can no longer pick and choose our actions – we need to do everything we can.” (Thunberg, 2022, p. 327)

Climate change is one of the greatest challenges of today’s time (Anderson & Calverley, 2022; Oreskes, 2022; Urisman Otto, 2022). The world’s average temperature is rising, we are already faced with wildfires and extreme weathers caused by climate change and even though scientists warn of the long-term effects of further global warming, efforts to save the climate are often not effective enough (Anderson & Calverley, 2022; Ossewaarde & Ossewaarde-Lowtoo, 2020; Urisman Otto, 2022). The power of big fossil fuel companies has slowed down the acknowledgement of climate change as a crisis and transitions towards a more sustainable future (McKibben, 2022; Urisman Otto, 2022).

Forests play a special role in the problems mentioned above (Erb & Gingrich, 2022). They are one of the biggest natural climate solutions as they can store vast amounts of CO<sub>2</sub>, but continuing deforestation reduces its capacities to do so (Erb & Gingrich, 2022; Jackson, 2022). A key

element for forests to be this bridging technology is their biodiversity and resilience, which is limited through procedures such as deforestation (Erb & Gingrich, 2022). Biodiversity has furthermore proven to impact ecosystems and slow down climate change (Purvis & De Palma, 2022).

The Hambacher forest displays both a high level of biodiversity and resilience (Bund für Umwelt und Naturschutz Deutschland, n.d.-a; Mohr & Smits, 2022; Purvis & De Palma, 2022). It can be defined as a temperate forest due to its location in the west of Germany, where looking at the global distributions of forests, temperate forests are located (Law, 2022). “Temperate forests have some of the highest carbon densities in the world” (Law, 2022, p. 103). Due to its high biodiversity and resilience, the Hambacher forest plays a special role in nature-based mitigation solutions, but its position as a bridging technology is weakened as the continuing deforestation since 1978 reduces its impact (Bund für Umwelt und Naturschutz Deutschland, n.d.-a; Mohr & Smits, 2022).

The importance of trees for rapid mitigation and ecosystem preservation, such as in the case of the Hambacher forest, has not been lost on citizens. Since the 1980s, but especially after the publication of the first Intergovernmental Panel on Climate Change (IPCC) report in 1990, there have been outcries in the population for environmentalism (Capstick et al., 2022; Jamison, 2010; Stoddard et al., 2021). In the last years we have seen a lot of demonstrations and civil unrests in multiple cases, with the protests in Lützerath as one of the latest and most visible cases (ZDF, 2023).

The social movements organizing protests like these have been a driving force in climate- and ecological action and helped shed a light upon the urgency of this crisis (Jamison, 2010; Thunberg, 2022). They can be defined “as a collective form of social behavior that is explicitly organized for political action” (Jamison, 2010, p.812). The mobilization of people is based on a common identity and similar or even the same values and knowledge, which are put forward during actions (Capstick & Whitmarsh, 2022; Jamison, 2010; Thunberg, 2022).

The main goal of social movements is political change. This goal is pursued through different means of (a) protests and direct action and (b) knowledge-utilization (Capstick & Whitmarsh, 2022; Jamison, 2010; Thunberg, 2022). Knowledge plays a central role in social movements and mobilization, especially due to the application of counterinsurgency tactics, which causes a bad connotation and reduces acceptance for acts of civil disobedience (Brock & Dunlap, 2018; Kaufer & Lein, 2018; Leach & Scoones, 2007; Liersch & Stegmaier, 2022). Counterinsurgency tactics furthermore decrease the impact actions of social disobedience have, thus looking at the

approach of knowledge utilization as an alternative approach is interesting (Brock & Dunlap, 2018).

The Hambacher forest movement pursues knowledge utilization as an alternative approach to activism (Liersch & Stegmaier, 2022; Mohr & Smits, 2022). Like other social movements, the Hambacher forest movement is a network of individuals and organizations pursuing the goal of political change (Mohr & Smits, 2022). It started off as a local initiative by residents of villages, which were close to the forest or needed to be relocated due to mining, in 1978 and became a global movement by the time of the clearing period 2018 (Brock & Dunlap, 2018; Liersch & Stegmaier, 2022). The involvement of many actors, initiatives and organizations led to a span of demands, but two common demands are represented in all participating parties (a) stopping of the deforestation and (b) termination of coal mining (Brock & Dunlap, 2018; Kaufer & Lein, 2018; Liersch & Stegmaier, 2022).

Even though the occupiers played an important role in slowing down the clearing of the Hambacher forest, this research will mainly focus on the formalized social movement (further as FSM), such as NGOs or citizens initiatives, as their approach to activism was intertwined with the use of knowledge and was not the focus of past studies (Brock & Dunlap, 2018; Kaufer & Lein, 2018; Liersch & Stegmaier, 2022).

The use of knowledge in processes of change can be analyzed through the knowledge utilization theory (Zaltman, 1979). Social movements, like the Hambacher forest movement, can utilize knowledge to pursue political change and therefore, this theory was chosen to conduct this case study (Jamison, 2010; Ottoson, 2009). To be exact, the knowledge utilization theory will be applied to study how knowledge was used to achieve political change and evaluate to what extent knowledge depicts the driver of change in this case (Zaltman, 1979). The theory suggests that scientific knowledge needs to be socially robust to be properly utilized and therefore, also needs the involvement of practical knowledge (Hoffmann et al., 2019). To evaluate the effectiveness of knowledge utilization Hoffmann et al. (2019) developed five phases of knowledge utilization with associated subcategories, which will be further introduced in the theory section. These categories will be later applied during the analysis to answer the research question.

In consideration of the existing corpus of literature, the scientific relevance of this case is given for multiple reasons. Firstly, it is remarkable due to many different approaches and knowledge involvement as a form of activism (Mohr & Smits, 2022). Over a timespan of seven years multiple occupations and evictions, lawsuits, campaigns, demonstrations, and knowledge-utilization processes took place (Mohr & Smits, 2022). Furthermore, the eviction of the forest squatters

was ordered by the North Rhine Westphalian state government, which provides the possibility to analyze power relation and allows the connection to the different clusters discussed in the paper by Stoddard et al. (2021). Three clusters were created to describe the power relations between climate actors, (a) Davos clusters, (b) enabler cluster and (c) ostrich and phoenix cluster. The Davos cluster covers those with vested interest and in power, which is to this point unchallenged while the enabler cluster consists of those who create and maintain the framework, which allows the continuing power and pursuit of vested interest of the Davos cluster. Lastly, the ostrich and phoenix cluster describe the diverse cultural foundation, which is challenging this power and enabling structures (Stoddard et al., 2021). Social movements are part of the phoenix and ostrich cluster and challenge both the Davos and enabler cluster, therefore analyzing the way current power structures are tackled through them is of scientific and social relevance.

Second, an interesting dimension is the historical one. Deforestation in the Hambacher forest has been taking place since 1978, so questions such as what changed in the following decades, what type of knowledge was used by the social movements and what role did this utilization of knowledge play in the termination of the deforestation can be raised (Bund für Umwelt und Naturschutz Deutschland, n.d.-a; Mohr & Smits, 2022). These two perspectives will allow to evaluate how knowledge was used by the Hambacher forest movement.

To conclude, it is relevant to conduct this research because the analysis will provide a deeper understanding of knowledge and how it can be utilized by social movements to pursue political change towards environmentalism (Jamison, 2010; Ottoson, 2009; Thunberg, 2022). Moreover, this research is of social relevance as social movements have proven to be the driving power of change in the past such as the civil rights movement in America for example (Jamison, 2010; Holt, 2023). Furthermore, over the past decades we have seen the power of big fossil fuel companies through strategies of weakening knowledge and establishing uncertainties, which intensified the need for effective counter action through social movements to achieve climate action (Almond et al., 2022; Anderson, 2022; Capstick & Whitmarsh, 2022; McKibben, 2022). Additionally, the scientific relevance is given due to the knowledge gap on the effectiveness of knowledge utilization by social movements (Chenoweth, 2022; Jamison, 2010).

The focus of my bachelor thesis will be on the role of knowledge types and how it was utilized by social movements to stop the deforestation in 2018. The overall research question is:

How did the Hambacher forest movement utilize different types of knowledge to stop the deforestation in 2018?

To answer the research question, the following sub-questions (further as SQ) will be examined:

1. What does the knowledge utilization theory tell us about transfer of knowledge into practice?
2. Which types of knowledge were used by the Hambacher forest movement?
3. How was this knowledge translated into political pressure?
4. What role did knowledge play in the success of the Hambacher forest movement?

Considering these questions, I want to conduct a case study of the Hambacher forest movement and use it as a positive example to analyze the role knowledge and its utilization can play in social movements. This case study will be based on a qualitative and descriptive approach. As a theoretical background to analyze the case I will use the knowledge utilization theory and apply it to the Hambacher forest movement.

### **3. Theory**

In the following chapter the main theoretical framework and parameter needed to answer the research question will be introduced. Firstly, the knowledge utilization theory will be introduced and a scheme for the following analysis will be presented. Following this, the medium for utilizing knowledge, social movements, will be presented. This will be followed by a presentation of knowledge about climate change and the role of forests, which can be utilized by the Hambacher forest movement.

#### *3.1. Knowledge utilization theory*

The knowledge utilization theory explains the use of knowledge in the context of different types of change, for this research political change towards environmentalism and the protection of the Hambacher forest (Zaltman, 1979). Different types of knowledge are taken into consideration and add to the explanation of knowledge utilization (Ottoson, 2009). Initially, four different types of knowledge were identified by Machlup (1979): practical, intellectual, spiritual, and

unwanted knowledge. As the theory was further developed, the two types of knowledge taken into consideration are practical and intellectual, also called scientific, knowledge (Blake & Ottoson, 2009; Hoffmann et al., 2019). The distinction between these two types of knowledge is the source and intent behind acquiring it, intellectual knowledge is acquired in the academic context and mostly based on interest in this topic or the need for a knowledge-based solution (Blake & Ottoson, 2009; Hoffmann et al., 2019). Practical knowledge on the other hand, is obtained outside of the academic context and is based upon practical experiences (Blake & Ottoson, 2009; Hoffmann et al., 2019).

This distinction has been criticized in the past due to these broad definitions and therefore lack of feasibility, so to clarify this Hoffmann et al. (2019) argue that both exist and are needed to further analyze knowledge utilization. Moreover, the authors add that still a combination of this knowledge is needed to create socially robust knowledge and achieve transformation through knowledge utilization (Hoffmann et al., 2019). To properly analyze the knowledge utilization by the Hambacher forest movement the distinction needs to be applied to study to what extent each was used and to what extent this knowledge was combined to create socially robust knowledge (Hoffmann et al., 2019).

To measure the effectiveness of knowledge utilization, Hoffmann et al. (2019) developed a 5-phase framework, which will be introduced in the following and applied during the analysis to evaluate the knowledge utilization process of the Hambacher forest movement. According to them knowledge utilization can be categorized and evaluated using these five phases:

1. Phase 1: Defining sustainability problems
2. Phase 2: Producing new knowledge
3. Phase 3: Assessing new knowledge
4. Phase 4: Disseminating new knowledge (in the realms of both science and practice)
5. Phase 5: Using new knowledge (in the realms of both science and practice)

(Hoffmann et al., 2019)

Each phase and its further sub-categories defined by the authors will be used to answer the SQ and the overall research question.

### *3.2. Social movements*



Social movements display a medium for knowledge utilization (Hoffmann et al., 2019; Leach & Scoones, 2007). They play an important role in calls to protect the climate and forests and have proven to achieve societal, systematic, and individual change in the past (Holt, 2023; Jamison, 2010; Thunberg, 2023).

Social movements are network-based structures, which connect individuals and organizations based on common norms and beliefs (Jamison, 2010; Jasper, 2010; Jasper, 2020). The individuals involved in those networks are often very diverse and break with traditions and norms with the intention to bring about political and individual change (Jamison, 2010; McAdam, 2017; Thunberg, 2022). Furthermore, the climate movement is active globally and on many different levels (Jamison, 2010; McAdam, 2017). This diversity plays an integral part in social movements as knowledge about climate change often needs to be seen in the context of their background and experience of the individuals (Capstick & Whitmarsh, 2022; Chenoweth, 2022; Thunberg, 2022). To tackle this, the environmental movements often make efforts to attempt collective learning (Jamison, 2010; Thunberg, 2022).

Through these procedures of learning and pushing for political change, the social movements challenge the Davos and enabler cluster and are therefore part of the phoenix and ostrich cluster (Stoddard et al., 2021). This distinction is also present in the case of the Hambacher forest movement where RWE AG (further as RWE), the coal mining company deforesting the Hambacher forest, and the state represent the Davos cluster and labor unions represent the enabler cluster (Liersch & Stegmaier, 2022; Stoddard et al., 2021). To tackle the existing power structures, social movements, like the Hambacher forest movement, can make use of different strategies such as forms of civil disobedience, demonstrations, judicial approaches, and knowledge utilization (Jamison, 2010, Thunberg, 2022). For this case study, the focus is on knowledge utilization and how social movements implement this.

Furthermore, it must be marked that during the analysis there will be a distinction within the Hambacher forest movement and not the whole movement will be analyzed. The distinction will be made between the formalized and unformalized part of the movement (Liersch & Stegmaier, 2022; Kaufer & Lein, 2018). This differentiation will be based on the factor of organization, approach to activism and traceability (Brock & Dunlap, 2018, Liersch & Stegmaier, 2022; Kaufer & Lein, 2018). This is done as the unformalized parts of the movement, such as the forests squatters, are often marked by high fluctuation in participants and their approaches to activism are often based on civil disobedience (Kaufer & Lein, 2018). To analyze knowledge utilization organizational structures and to some extent consistency in participant and

organizations is needed, therefore the following analysis will focus on the FSM as the medium of knowledge utilization in the Hambacher forest.

### *3.3. Climate change and the role of forests*

The FSM could utilize multiple conclusions of knowledge to achieve their goals of political change. Their general concern is climate change (Brock & Dunlap, 2018; Mohr & Smits, 2022). “Climate change refers to long-term shifts in temperatures and weather patterns” (United Nations, 2022). Human activities, especially the use of fossil fuels and actions that lead to greenhouse gas emissions, have been the driver of climate change and lead to an increasing earth temperature (Jamison, 2010; McKibben, 2022; United Nations, 2022). Besides these factors the sum of deforestation and greenhouse gas emissions have led to climate change, which will cause more extreme weathers, health problems, rise in sea-levels and much more (Jamison, 2010; McKibben, 2022; Oppenheimer, 2022; United Nations, 2022). Current measures are often not effective enough due to the lobbying and influence of the fossil fuel industry, which caused the lack of acknowledgement of climate change as an existential crisis (Anderson, 2022; Anderson & Calverley, 2022; Edwards, 2022; McKibben, 2022).

Considering the case of the Hambacher forest, the following three intellectual and practical sources of knowledge could be utilized to tackle existing power structures and cause political change towards environmentalism:

1. The forest is important for mitigation itself.

Mitigation techniques can slow down climate change and allow sticking to the carbon budget (Oppenheimer, 2022; United Nations, 2022). The biggest nature-based mitigation technique are forests (Erg & Gingrich, 2022; Peter, 2022). As Jackson (2022, p. 236) puts it: “We can put billions of tonnes of carbon back into land through natural climate solutions such as forest and wetland restoration [...]”. Temperate forests, such as the Hambacher forest, showcase the highest amount of carbon density, but their efficiency is highly dependent on their age, resilience, and biodiversity (Law, 2022). Deforestation, wildfires, and heat are weakening forests continuously and a study by the German federal ministry for food and agriculture showed that four out of five trees are sick due to the effects climate change and deforestation (Bundesministerium

für Ernährung und Landwirtschaft, 2023). For the Hambacher forest to act as a mitigation technique deforestation needs to be stopped.

2. The coal for which the forest is cut down for adds further to global warming.

In the case of the Hambacher forest deforestation takes place to access the coal lying underneath and around the forest (Liersch & Stegmaier, 2022; Mohr & Smits, 2022). CO<sub>2</sub> emissions caused by burning of coal are one of the biggest driving forces of climate change (Hausfather, 2022). To slow down climate change there is the need to reduce CO<sub>2</sub> drastically as it acts like a magnifying glass in the atmosphere and increases the earth's average temperature (Hausfather, 2022; Jamison, 2010). The carbon budget has been drastically shrinking and with current policy measures, climate goals, like the 1,5°C goals, will most likely be missed, which would mean effects of climate change intensified (Anderson & Calverley, 2022). So, to reduce CO<sub>2</sub> emissions the coal underneath the Hambacher forest should not be accessed and used.

3. Biodiversity is under threat if forests are not protected.

Lastly, biodiversity also plays a major role in climate change and mitigation as it has proven to slow down climate change (Erb & Gingrich, 2022; Purvis & De Palma, 2022). Furthermore, forests display preservation areas of biodiversity (Erb & Gingrich, 2022). Biodiverse forests therefore, have a positive impact on climate change and can slow down the effects of it (Erb & Gingrich, 2022; Purvis & De Palma, 2022). So, continuing deforestation also displays a threat to biodiversity. In the case of the Hambacher forest high levels of biodiversity are given, thus there is the need to protect the forest and the biological diversity in it.

## **4. Method**

To answer the research question “How did the Hambacher forest movement utilize different types of knowledge to stop the deforestation in 2018?” a deductive, qualitative case study of the Hambacher forest movement will be conducted. In the following chapter, the methodology will further be introduced.

### *4.1. Case selection*

Case study research is a suitable methodology to this research question as the Hambacher forest movement is a very prominent social movement and the success in stopping the deforestation in 2018 represents a phenomenon that merits understanding (George & Bennett, 2005; Given, 2008; Mohr & Smits, 2022).

An in-depth qualitative case study approach has great benefits.

The case study approach creates an opportunity to test and possibly further develop the knowledge utilization theory in general and the better utilization of knowledge by social movements in particular (Given, 2008). This case provides the opportunity to study what type of knowledge was used, how it was used and what its impact was in consideration of stopping the deforestation. An examination of the Hambacher forest movement and its utilization of different types of knowledge thereby helps to understand the complex relationship between social movements, knowledge and power and set the stage for possible generalizations (George & Bennett, 2005; Given, 2008).

As established before, only the knowledge utilization by FSM will be analyzed. To determine if an organization of initiative was part of the FSM, their structures and statutes were reviewed. The questions to determine the classification as FSM were: Is the organization or initiative structured continuously, in terms of a chairman, organizational structures like advisory boards and employees? Is the political standing of the organization or initiative based on scientific findings and based on a grassroots democratic system? Is the financing independent from companies and/ or political parties? Furthermore, the factor of relevance in the context was taken into consideration. Especially, the environmentalist organizations and initiatives engaged in the “Commission on Growth, Structural Change and Employment” (German: Kommission für Wachstum, Strukturwandel und Beschäftigung), which was set into place by the German government to provide solutions on the German coal phase out, were taken into consideration. The “Commission on Growth, Structural Change and Employment” will be introduced and contextualized later in the analysis, but it must be marked, that it is mostly known under the name coal commission, so in the following it will be referenced to as such (Groll, 2019).

Based on these factors, the following organizations will be covered in the analysis: Friends of the Earth Germany (German: Bund für Umwelt und Naturschutz Deutschland further as BUND), citizen initiative Buirer für Buir, Robin Wood, Nature and Biodiversity Conservation Union Germany (German: Naturschutzbund Deutschland further as NABU), Greenpeace Germany and German Nature Conservation Circle (German: Deutscher Naturschutzring further as DNR). All these organizations finance themselves independently and have to some extent

formalized structures. They all have either a chair or presidency and except Buirer für Buir all have one or multiple offices with employees supporting and organizing the work of the organization, its volunteers, and members (Bund für Umwelt und Naturschutz Deutschland, 2021; Deutscher Naturschutzring, 2019b; Greenpeace e.V., 2017; Initiative Buirer für Buir, 2020; NABU - Naturschutzbund Deutschland e.V., n.d.-a; NABU - Naturschutzbund Deutschland e.V., n.d.-c; Robin Wood, n.d.). Furthermore, according to their own statements and statutes they work based on scientific findings and include their members through meetings, discussion rounds and workshops into their decision-making processes (Bund für Umwelt und Naturschutz Deutschland, 2021; Deutscher Naturschutzring, 2019b; Greenpeace e.V., 2017; Initiative Buirer für Buir, 2020; NABU - Naturschutzbund Deutschland e.V., n.d.-a; NABU - Naturschutzbund Deutschland e.V., n.d.-c; Robin Wood, n.d.). Besides Robin Wood all of them were represented in the coal commission by members of their organization or initiative (Bundesministerium für Wirtschaft und Energie, n.d.). Robin Wood is still included in the following analysis, as it was closely cooperating with all initiatives mentioned above and therefore, was strongly involved in their knowledge utilization processes and so it is necessary the review them too (Initiative Buirer für Buir, 2018b).

It further must be marked, that the knowledge utilization by the FSM will mainly be analyzed in the year 2018 as the main events connected to knowledge utilization took place during that time and the conflict surrounding the Hambacher forest became more and more prominent in media coverage and in society (Bund für Umwelt und Naturschutz Deutschland, 2018; Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V., 2021). To answer the research question, aspects after 2018 concerning the Hambacher forest, its protection and shifts in policymaking will be taken into consideration, but they will be kept short as they only showcase the result of the knowledge utilization (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V., 2021).

The background of this analysis is, that “[s]ince the start of the mining of coal in 1978 [...] the size of the „Hambacher Forest“ was reduced from 41 square kilometres to around 6 km<sup>2</sup> today.” (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V., 2018, p.1) The following decades, local initiatives got involved in trying to stop deforestation (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V., 2021). Especially the years coming up to 2018, multiple legal actions were taken against RWE by BUND, but till 2017 they all failed (Bund für Umwelt und Naturschutz Deutschland

Landesverband Nordrhein-Westfalen e.V, 2021). In 2017, legal action against the operating plan from 2014-2017 caused a procrastination of the deforestation season, which protected 56 hectares of forest (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, 2021). Following this, the operating plan from 2018 till 2020 was approved by the municipality Arnsberg, which threatened the forest again and displays the starting point of the analysis (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, 2021).

#### *4.2.Method of data collection*

To study this case starting from 2018, a literature-based study will be conducted. The main sources will be scientific publications and published media sources. Most of the literature used for the theoretical background and the analysis will be scientific articles, case studies and books or book chapters. A keyword-based search in portals for scientific literature, online libraries and newspapers was conducted to find suiting literature for the research question.

1. The following key words were used to find scientific findings published, presented during conferences, or created for organizations.: climate change; forest(s); climate change and the role of forests; biodiversity; carbon storage; phase out; coal phase out; knowledge utilization theory; social movement(s).
2. Furthermore, media, news articles, statutes, and commentaries from the different interest groups, such as sub-organizations of the FSM, will be included to get an overview on the different perceptions and opinions on the deforestation in 2018. The following key words were used to find relevant publications: Hambacher forest; social movement(s); climate action; activism; biodiversity, coal phase out, forest protection.

Based on the literature corpus found through the keyword-based search, further literature will be found by looking at the references and remarks in the literature. The literature found will be judged based on the following criteria: relevance in the academic context (relevance in the field; societal and scientific relevance) and for the research question, credibility of the author and source, content related to the research question, bibliography of the literature.

In the following, the table for the qualitative content analysis will be introduced, which was based on the initial corpus of literature found through the literature search. Given the fact that the knowledge utilization theory is my general theory, the overall structure developed by Hoffmann et al. (2019) was adapted to the case. I took the literature and knowledge developed in

the theory section into consideration to (a) further accommodate the five-phase-model to my research and (b) discriminate between ‘intellectual’ and ‘practical’ knowledge. Here, intellectual knowledge includes all scientific findings and -studies of general themes such as in the paper about forests by Erb and Gingrich (2022). To analyze aspects of practical knowledge, the thesis includes publications by FSM or interview-based scientific publications about the Hambacher forest such as the publications by Bund für Umwelt und Naturschutz Deutschland (n.d.-a) and Mohr and Smits (2022).

This distinction and the table in general will be taken into consideration to find further feasible literature for the analysis. As the analysis is focused on the FSM, the publications of organizations and representatives mentioned and found in the initial search of literature will be looked at more deeply too.

#### *4.3.Method of data analysis*

The literature corpus will be analyzed through a qualitative content analysis. This literature-based study of the case will allow a thorough study of the different knowledge types, the social movement, the approaches to knowledge utilization and different levels of this case (Gläser & Laudel, 2013). The method was developed to allow a more in-depth analysis than coding text or quantitative approaches, therefore it is suitable for this case (Elo & Kyngäs, 2008; Gläser & Laudel, 2013).

The complexity of knowledge utilization and the Hambacher forest movement as a medium can be analyzed thoroughly (Given, 2008). The following qualitative content analysis will be a deductive content analysis as it is based on the knowledge utilization theory and the phase scheme further developed by Hoffmann et al. (2019). This approach is taken, because there is already an existing amount of data, which will be analyzed in a new context (Elo & Kyngäs, 2008; Gläser & Laudel, 2013).

The five-phase scheme presented by Hoffmann et al. (2019) was adapted in accordance with the preexisting knowledge on the case and expectations formed based on the theoretical background developed above. Out of the five phases, four phases will be included in the analysis as phase three is cut out. Hoffmann et al. (2019) propose phase three to assess the new knowledge, which was acquired beforehand, and judge it according to its relevance. This phase is cut out as three main arguments, which can be utilized by the FSM, were already developed in the theory section based on the arguments found in scientific publications and reports on the case.

The following table will therefore only showcase four phases and former phases four and five move up one space each.

The qualitative content analysis therefore will be carried out in accordance with the following scheme:

Phases:	Sub-categories:
1. Defining sustainability problems	<p>Definition and connected research process of a jointly recognized sustainability problem, which is processed in the realms of both science and practice:</p> <ul style="list-style-type: none"> <li>• stopping of the deforestation</li> <li>• termination of coal mining</li> </ul>
2. Producing new knowledge	<p>Development of knowledge, in the realm of science and practice, and following combination to create robust knowledge:</p> <ol style="list-style-type: none"> <li>1. The forest is important for mitigation itself. <ul style="list-style-type: none"> <li>○ Intellectual: Forests act as CO<sub>2</sub> storages and slow down climate change.</li> <li>○ Practical: The Hambacher forest improves the region’s air quality.</li> </ul> </li> <li>2. The coal for which the forest is cut down for adds further to global warming. <ul style="list-style-type: none"> <li>○ Intellectual: Emissions caused through the burning of coal are a major driver of climate change.</li> <li>○ Practical knowledge: Coal mining negatively effects the region as citizens must be relocated, the forest is cut down for it and coal is a CO<sub>2</sub> intensive energy.</li> </ul> </li> <li>3. Biodiversity is under threat if forests are not protected.</li> </ol>



	<ul style="list-style-type: none"> <li>○ Intellectual: Biodiversity slows down climate change.</li> <li>○ Practical: The Hambacher forest is the natural habitat for many special species.</li> </ul>
3. Disseminating new knowledge (in the realms of both science and practice)	Participation of the Hambacher forest movement in public relations through social media towards target groups, engagement in debates or advisory boards (e.g., coal commission) and organization of exchanges between different target groups.
4. Using new knowledge (in the realms of both science and practice)	New knowledge is presented, distributed, assimilated, and discussed in the science realm. As soon as it is recognized, it is applied further in the judiciary, political and public context to create pressure towards transition. The sustainability problem is therefore addressed in the practical realm to bring transformation towards achieving the environmental goals defined in phase one.

(Hoffmann et al., 2019)

## 5. Analysis

In the following the analysis will be conducted.

### *5.1. Analysis of phase 1: Defining sustainability problems*

Phase 1 “Defining sustainability problems” will be analyzed in the following. In consideration of the preexisting knowledge developed before the analysis, I suggested the FSM to define two goals: (1) stopping of the deforestation and (2) termination of coal mining, which were taken into consideration during the analysis.

To find the definitions of the sustainability problem, I analyzed the statutes and declarations of the different organizations. In all of the statutes and declarations made by the FSM environmentalism was set as a general goal with each organization having their own emphasis on

specific topics (Bund für Umwelt und Naturschutz Deutschland, 2021; Deutscher Naturschutzring, 2019b; Greenpeace e.V., 2017; Initiative Buirer für Buir, 2020; NABU - Naturschutzbund Deutschland e.V., n.d.-a; NABU - Naturschutzbund Deutschland e.V., n.d.-c; Robin Wood, n.d.). Basis for supporting environmentalism is the problem awareness towards climate change and the interconnected actions and problems, such as accessing CO<sub>2</sub> intensive coal results in the relocation of villages or deforestation (Initiative Buirer für Buir, 2020). These are problems both in the intellectual and practical realm (Bund für Umwelt und Naturschutz Deutschland, 2021; Initiative Buirer für Buir, 2020). The scientific problem being the general question “How to stop climate change?” while the practical problem, also called societal problem, raises concerns surrounding the effects of climate change: relocation of villages, health risks due to mining and the loss of biodiversity in the region of the Hambacher forest (Bund für Umwelt und Naturschutz Deutschland, 2021; Initiative Buirer für Buir, 2020). Furthermore, the scientific realm is also taken into consideration in the FSM itself through advisory bodies like the scientific council of BUND, which task is to define sustainability problems, advise the organization in setting goals and helping to develop solutions for societal problems based on intellectual knowledge (Bund für Umwelt und Naturschutz Deutschland, 2021; NABU - Naturschutzbund Deutschland e.V., n.d.-a).

The problem awareness for climate change is present in this case, so looking at the FSM declarations on the Hambacher forest also provides an overview over the problem depiction and the goals set. BUND defines both goals as suggested and especially takes the 1,5° C goal set in the Paris Agreement into consideration (Bund für Umwelt und Naturschutz Deutschland, 2018). Just like BUND, NABU argues, that deforesting the Hambacher forest will overstep a red line and reaching the 1,5° C would become impossible especially taking the lack of coal phase out into consideration (NABU - Naturschutzbund Deutschland e.V., 2018; NABU Nordrhein-Westfalen, 2018). Furthermore, NABU set the goal termination of coal to be in 2035 at the latest (NABU - Naturschutzbund Deutschland e.V., 2018). In addition, Greenpeace argues towards reaching both goals defined beforehand but sets a stricter timeline for a coal phase out till 2030 (Sadik, 2018). Both Greenpeace and Buirer für Buir on the other hand did not publish specific declarations considering the goals to reach in the Hambacher forest. Deriving from their statues, it can be argued that they position themselves against coal and advocate for the protection of the environment, especially keeping landscapes and biodiversity protected, which implies the fulfillment of both predefined goals (Greenpeace e.V., 2017; Initiative Buirer für Buir, 2020). Further, Buirer for Buir adds the protection of villages in the mining area to the list of goals, but as this is a problem interconnected with coal mining, I would argue it can be

connected to the goal termination of coal (Initiative Buirer für Buir, 2020). Lastly, the DNR also defined both goals as main focuses of their work in their annual report concerning 2018 (Deutscher Naturschutzring, 2019b).

Concluding, all members of the FSM as anticipated agreed upon the two predefined goals and the biggest difference is the time suggested for the coal phase out. Besides the general agreement by all members of the FSM on the two goals, a report by Robin Wood moreover marks the importance and the intend of the FSM to achieve societal change towards environmentalism by reaching their goals to secure climate protection in long term (Heise & Ballenthien, 2018). To do so, the FSM plans to apply old, new, intellectual, and practical knowledge and engage with the public and politics, which will be analyzed in the following phases (Heise, 2018b; Heise & Ballenthien, 2018; Initiative Buirer für Buir, 2021).

### *5.2. Analysis of phase 2: Producing new knowledge*

For phase 2 “Producing new knowledge” the three predeveloped knowledge-based arguments with under-categories considering intellectual and practical knowledge will be analyzed for, especially taking the knowledge production processes into consideration. For the following analysis, it must be kept in mind, that these organizations closely cooperate and exchange their knowledge, so new knowledge, either intellectual and/ or practical, is shared. The production of knowledge therefore is often based in one or two organizations but reproduced and distributed by all of them.

The FSM has different bodies, procedures, and people responsible for the knowledge production. In consideration of the analysis, there are three prominent aspects between which can be distinguished: scientific councils, employees with specific expertise, and commissioned studies. These backgrounds will be introduced shortly and then brought up in the following in consideration of the predeveloped arguments.

One way to produce knowledge, which was found during the analysis, was a scientific council, which is put into place to support the work of organizations, which are part of the FSM. The form of the scientific councils is highly dependent on the structure of the organization and in this case they can for example be found in BUND and NABU (Bund für Umwelt und Naturschutz Deutschland, 2021; NABU - Naturschutzbund Deutschland e.V., n.d.-a). For BUND the scientific council is intertwined with the organizational structures as all campaigns are coordinated between the scientific council and the chair of the organization and the publications

are all based on the work of the scientific council or written by members of it (Bund für Umwelt und Naturschutz Deutschland, 2021). The members are mostly of scientific background and develop intellectual knowledge themselves, which is then further adapted to a specific problem, such as the Hambacher forest, to create practical knowledge (Bund für Umwelt und Naturschutz Deutschland, 2021; NABU - Naturschutzbund Deutschland e.V., n.d.-a). While the scientific council of NABU is less intertwined with the chair of the organization itself, its work is the base of all publications by the organization too (NABU - Naturschutzbund Deutschland e.V., n.d.-a). In both cases large groups of people with scientific background and expertise work in committees concerning specific topics such as “Energy and climate” or “Forests and wilderness” to supply the work of the whole organization (NABU - Naturschutzbund Deutschland e.V., n.d.-a).

During the analysis, knowledge production could also be linked to the employees of the FSM organizations. All members of the FSM, besides Buirer for Buir have employees supporting their work (Bund für Umwelt und Naturschutz Deutschland, 2021; Deutscher Naturschutzring, 2019b; Greenpeace e.V., 2017; Initiative Buirer für Buir, 2020; NABU - Naturschutzbund Deutschland e.V., n.d.-a; NABU - Naturschutzbund Deutschland e.V., n.d.-c; Robin Wood, n.d.). Besides administrative tasks, the organizations often hire employees with an expertise such as Ronja Heise from Robin Wood as she works towards more knowledge in the field of energy (DZ4 Der Solarpionier, 2021; Heise, 2018b). The employees can have different focus in their work, but their task is to conduct background research, exchange with the scientific councils or other experts and coordinate the knowledge-based work of these organizations (DZ4 Der Solarpionier, 2021; Kolberg, n.d.).

Lastly, the work of the FSM is moreover supported through commissioned studies by research institutes. To support their work organizations furthermore finance independent studies, such as the study about a possible German coal phase out by Wehnert et al. (2017). This work is part of the finance plans of the organizations and is supposed to accommodate their work (Bund für Umwelt und Naturschutz Deutschland, 2018; Sadik, 2018). These studies mostly take intellectual knowledge, e.g., coal is a CO<sub>2</sub> intensive energy, into consideration and apply it to a question suggested by the FSM to create further intellectual knowledge, which is then applied to a problem or case to create practical knowledge (Bauknecht et al., 2018).

To summarize, the most prominent ways of knowledge production by the FSM were scientific councils, employees with expertise and commissioned studies. The knowledge production process was therefore, engaged with the intellectual realm and applied intellectual knowledge to

create practical knowledge. The ways of knowledge production will now be highlighted in consideration of the predeveloped arguments.

#### 5.2.1. The forest is important for mitigation itself.

One of the knowledge-based arguments developed in advance of the analysis was “The forest is important for mitigation itself”. This knowledge was not found frequently during the analysis process as most of the knowledge was developed about the implications of the Hambacher forest being an old forest such as high biodiversity levels, which will be analyzed later (Bund für Umwelt und Naturschutz Deutschland, n.d.-a; Heise & Bertrand, 2018).

In consideration of the IPCC report it was marked that forests and their interrelated biodiversity play a major role in slowing down climate change (Schneider, 2018). But it must be acknowledged that the IPCC report was published in October 2018 at the end of the struggles considering the Hambacher forest (Schneider, 2018).

Knowledge on the forests role in the regions was mostly not produced, while its size and age were taken into consideration. For example, Michael Zobel a forest expert stated that the Hambacher forest displays trees, which are partly 300 years old as there were no major interventions in the development of the forests besides the deforestation since the postglacial times (Heise, 2018a; Heise & Ballenthien, 2018). The knowledge produced about the forests is its unique age and therefore it is worth protecting (Greenpeace e.V., 2018a; Heise, 2018a; Heise & Ballenthien, 2018). Lastly, practical, judicial knowledge was produced through a legal opinion by Cornelia Ziehm in commission of Greenpeace, which argues that the right to continue mining is lower grade than the protection of the forest, so legal knowledge is supporting the protection of forests too (Weiland, 2018).

This knowledge was produced through engagement with experts by the employees of Robin Wood for example or generally referencing the work of scientific workgroups within the organizations (Greenpeace e.V., 2018a; Heise & Ballenthien, 2018). But both intellectual and practical knowledge concerning the forests and its role as a mitigation mechanism was not produced.

#### 5.2.2. The coal for which the forest is cut down for adds further to global warning.

On the other hand, knowledge on the role of coal was produced more extensively, which further had implications for the forests and its protection. The predeveloped argument “The coal for which the forest is cut down for adds further to global warming.” was used by all members of the FSM.

Multiple members of the FSM commissioned studies by different research institutes to prove the lack of requirement to access the coal underneath the region and highlights its role in global warming. For example, Wehnert et al. (2017) conducted a study of different scenarios on the German coal phase out for NABU (NABU - Naturschutzbund Deutschland e.V., 2018; Wehnert et al., 2017). The main findings were that to maintain the climate goals set in the Paris Agreement a coal phase out till 2035 at latest is needed and furthermore energy supply security is not at risk if the first seven power plants would be shut down till 2020 (NABU - Naturschutzbund Deutschland e.V., 2018; Wehnert et al., 2017). In this study the intellectual knowledge of the impacts of coal burning were taken into consideration and applied to the case of Germany, then further practical knowledge about the scenarios considering the Hambacher forest were developed: increased health risks in the region; reduced groundwater levels; relocation of villages; comparatively higher emissions of the older power plants, which are also supplied by the Hambach mine (NABU - Naturschutzbund Deutschland e.V., 2018; Wehnert et al., 2017). This study is further supported by the other members of the FSM as they produce the knowledge, that North Rhine Westphalia has the highest yearly CO<sub>2</sub> emission in the whole of Germany and the coal underneath the Hambacher forest is not needed for Germanies energy supply security (Heise & Bertrand, 2018; Heise, 2018b; Initiative Buirer für Buir, 2018b; Initiative Buirer für Buir, 2018c). Furthermore, intellectual knowledge about future energy systems is applied again in the study by the Institute of Applied Ecology in commission of BUND, which shows, that continuing mining would still be possible without deforestation and relocation of villages and the recultivation of the remaining mining area will also be possible without continuing mining (Bauknecht et al., 2018; Bund für Umwelt und Naturschutz Deutschland, n.d.-a; Krämerkämper, 2018). Again, all “[t]his can be done without jeopardizing security of supply, as a study by the Fraunhofer Institute for Energy Economics and Energy System Technology (Fraunhofer IEE) commissioned by Greenpeace shows.” (Sadik, 2018).

This again showcases that the FSM bases their practical knowledge on intellectual knowledge and furthermore uses commissioned studies to support their political goals. Besides basing their argumentation on scientific findings, the citizen initiative Buirer für Buir additionally works a lot with reporting and communicating practical knowledge from the citizens (Initiative Buirer

für Buir, 2018a; Initiative Buirer für Buir, 2018b). Therefore, the knowledge production concerning coal is based on commissioned studies, engagement of employees with that knowledge and reporting from own experience.

### 5.2.3. Biodiversity is under threat if forests are not protected.

Lastly, the knowledge-based argument “Biodiversity is under threat if forests are not protected.” is taken into consideration. This argument is connected to the knowledge on the Hambacher forest, as biodiversity and the age of forests interplay in this case (Bund für Umwelt und Naturschutz Deutschland, n.d.-a).

This argument is mostly backed by practical knowledge as the biodiversity levels in the forest can mostly only be studied by being present in the forest and counting specific animals, referencing to their species size, and studying the environment they live in (Buschmann, 2018; Heise & Ballenthien, 2018; Kolberg, n.d.). The biodiversity of the Hambacher forest was monitored through cooperations between members of the FSM as BUND and NABU were collaborating in a working group to count, mark and track the population numbers of the “*Myotis bechsteini*”, more commonly known as the Bechstein’s bat and successfully located around 500 bats in the Hambacher forest (Buschmann, 2018). The Bechstein’s bat is an endangered bat, which can be found in Germany, especially in temperate forests (Conservation of Natural Habitats and of Wild Fauna and Flora, 1992; Kolberg, n.d.). Besides finding and counting the bat, the FSM also published information on it such as its living and breeding habits (Kolberg, n.d.). The findings imply, that the relocation of it is most likely not possible “[s]ince Bechstein's bats are very site-faithful and not very migratory [...] they lack dispersal potential. “(Kolberg, n.d.) The knowledge of an endangered species living in the Hambacher forest implies the practical knowledge of also needing to protect the forest. Furthermore, observations of the forests were used to create even more knowledge about its biodiversity and “[t]he “Hambacher Forst” is a living space and retreat for rare animals, protected under EU law, such as the middlespotted woodpecker, the spring frog or the dormouse. Moreover, around 100 species of birds can still be found here.” (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V., 2018, pp.1) Intellectual knowledge about breeding habits is taken into considerations, but mostly the members of the FSM engage in observing the forest to create practical knowledge about its biodiversity.

To conclude, knowledge was produced considering all three predeveloped arguments with the focus being on the impact of coal and biodiversity, which then had implications for the forest. All arguments were closely interconnected and knowledge production took place in the FSM itself and research institutes commissioned by the FSM, so intellectual knowledge was produced and applied to bring forward practical knowledge.

### *5.3. Analysis of phase 3: Disseminating new knowledge*

Phase 3 “Disseminating new knowledge” describes the processes of the FSM to achieve public attention towards their knowledge to reach knowledge utilization. During the analysis the disseminating of knowledge could be distributed into political advocacy and working towards target groups.

Part of the knowledge dissemination suggested in the qualitative content analysis table was the engagement in advisory boards, political advocacy, which was done by the FSM (Bundesministerium für Wirtschaft und Energie, n.d.). As established beforehand, the coal commission was an advisory board put into place by the German government to find suitable consensus concerning energy supply safety, labor, economy, and environment for the German coal phase out (Bundesministerium für Wirtschaft und Energie, 2019; Groll, 2019). The commission was working by listening to expert opinions, reading their reports, and moreover partaking in visitations in the mining regions (Bundesministerium für Wirtschaft und Energie, 2019). During the visitation of the coal commission in the Rhine mining area, the Hambacher forest and mine are officially declared to belong to it, on the 24<sup>th</sup> of October 2018 further members of the FSM were present to formulate demands while backing it with the predeveloped knowledge analyzed in phase 2 (Bund für Umwelt und Naturschutz Deutschland, 2018). The visitations brought up the opportunity to discuss with the different interest groups of this case (Bundesministerium für Wirtschaft und Energie, 2019). Furthermore, more studies and reports specifically written for the coal commission were presented such as the study by Oei et al. (2018) on the effects and role of coal in North Rhine Westphalia. This study supported knowledge already developed by the FSM as the authors argue, that the Hambacher forest displays high levels of biodiversity worth protecting according to the “Conservation of natural habitats and of wild fauna and flora” directive of the European Union and mining needs to stop for Germany to reach its self-set climate goals (Oei et al., 2018). This marks the place in which the intellectual and practical realm engage with each other, which strengthen the dissemination of knowledge (Bundesministerium für Wirtschaft und Energie, 2019; Hoffmann et al., 2019, Oei et al., 2018).



Furthermore, the members of the FSM, which were also members of the coal commission, were using the predeveloped knowledge to reach consensus within the coal commission towards the goals defined in phase 1 (Bundesministerium für Wirtschaft und Energie, 2019; Deutscher Naturschutzring, 2019a). The final report was published in January of 2019 and is supposed to guide policymakers in decision making concerning the coal phase out, which will be further analyzed in phase 4 (Bundesministerium für Wirtschaft und Energie, 2019).

Parallel to advocacy work and knowledge disseminating in the coal commission some members of the FSM were trying to advocate on the European level and get the Hambacher forest acknowledged in accordance with the “Conservation of natural habitats and of wild fauna and flora” directive of the European Union (Deutscher Naturschutzring, 2018).

On the other hand, the FSM was introducing knowledge to target groups, which can be defined as everybody who interest in environmentalism (Heise & Ballenthien, 2018). Spreading knowledge towards targets groups was done through many different approaches. Michael Zobel for example offered guided tours through the forests and introduced the forest, its worth for biodiversity and furthermore showcased the coal mine (Heise & Ballenthien, 2018). During these walks, everybody was able to ask questions to get as much information as needed and many people were using this opportunity (Heise & Ballenthien, 2018; Initiative Buirer für Buir, 2018a). The opportunity to furthermore educate oneself was offered online as the FSM published information, statements linking the background knowledge and interviews (Bund für Umwelt und Naturschutz Deutschland, n.d.-a; Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, 2021; Greenpeace e.V., 2019b; Heise & Bertrand, 2018; Initiative Buirer für Buir, 2018c). Furthermore, information was also made accessible in English, so that the international community would have access to the knowledge (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, 2018). Besides that, learning platforms, which were already installed beforehand, also offered the opportunity to study more about forests, biodiversity, and coal and if wanted, partaking in workshops was possible too (NABU - Naturschutzbund Deutschland e.V., n.d.-b). Apart from intellectual and practical knowledge being published, the FSM was also advocating for the citizens to be more engaged and used the predeveloped knowledge as an argument to do so, but furthermore offered advise on how to get more engaged and learn more about the Hambacher forest (Greenpeace e.V., 2018b). This is further pushed by the FSM inviting citizens to attends demonstrations (Greenpeace e.V., 2018a; NABU Nordrhein-Westfalen, 2018). During these

demonstrations the predeveloped knowledge was presented during speeches and demands were further formulated based on this knowledge (Greenpeace e.V., 2018a; Grothus, 2018; Initiative Buirer für Buir, 2018c; NABU Nordrhein-Westfalen, 2018).

Concluding, the FSM was able to access large numbers of people interested in environmentalism and therefore, knowledge dissemination was successful (Initiative Buirer für Buir, 2018a). Furthermore, the knowledge was presented during advocacy work, thus its dissemination also took place there and all aspects suggested in the qualitative content analysis table were fulfilled.

#### *5.4. Analysis of phase 4: Using new knowledge*

Lastly, phase 4 “Using of knowledge” describes the use of knowledge in different contexts: judicial, political, and public. As established before, the developed knowledge was disseminated in the advocational and public context, where it became public and known, so now the question of how it was translated into political pressure will be analyzed.

The judicial approach was taken by BUND, to be exact mostly by the regional North Rhine Westphalian chapter (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, n.d). For this case, the lawsuit concerning the main operation plan 2018 till 2020 is of interest due to the period chosen for the analysis. BUND tried to stop mining and deforestation, which was initially allowed by the municipality Arnsberg in the beginning of 2018, through the judicial process (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, n.d.). During the process it was made use of two of the three predeveloped arguments and the associated knowledge: coal and biodiversity (Initiative Buirer für Buir, 2018d). Before the trial, the FSM developed the knowledge, that the coal underneath the Hambacher forest is not needed to maintain Germanies energy supply security and during the trial both RWE and the municipality Arnsberg failed to support their claim, that it was needed (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, n.d.; Initiative Buirer für Buir, 2018d). Furthermore, the high biodiversity levels in the forest were brought up as an argument against deforestation and especially the presence of the endangered Bechstein’s bat, which population numbers were counted by the FSM, brought the court to the conclusion that the Hambacher might fall under the “Conservation of natural habitats and of wild fauna and flora” directive of the European Union (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, n.d.; Buschmann, 2018; Initiative Buirer für Buir, 2018d). This utilization of knowledge led the court to rule an

early decision on the 05<sup>th</sup> of October 2018, that no further deforestation is allowed until there has been an extensive evaluation of the Hambacher forest, which ensured the forests protection for the time being (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, n.d.; Initiative Buirer für Buir, 2018d; Oberverwaltungsgericht für das Land Nordrhein-Westfalen, 2018). The general lawsuit concerning the operation plan 2018 till 2020 was not decided on at that point and mining was still allowed, but there ought to be no harm be done to the forest (Verfassungsgericht Köln, 2018; Oberverwaltungsgericht für das Land Nordrhein-Westfalen, 2018). Later, this lawsuit against mining was denied, but the overall decision to evaluate the biodiversity and habitat of the Hambacher forest remained and it created a window of opportunity for the political use of knowledge (Heise, 2018b; Verfassungsgericht Köln, 2018).

While the FSM still waited for the court ruling, they were simultaneously active in political advocacy and utilized knowledge in the coal commission. 2018 was a year of high intensity, especially RWE pushing towards deforestation by evicting the forests squatters caused a lot of pressure for the coal commission to come to their decision (Deutscher Naturschutzring, 2019a). In the coal commission intellectual knowledge by research centers was presented while at the same time the FSM advocated for environmentalism through introducing their own intellectual and practical knowledge (Bundesministerium für Wirtschaft und Energie, 2019). Simultaneously, the public support was rising, which gave backing to the actions of the FSM in the coal commission (Bund für Umwelt und Naturschutz Deutschland, n.d.-b; Greenpeace e.V., 2019a).

In the public context the FSM was working towards achieving more attention and reach more people beside the initial target group (Greenpeace e.V., 2019a). After publishing and disseminating the new knowledge, the FSM coal commission members started a campaign and BUND stated: “Together we have launched a successful online campaign for a rapid coal phase-out and Hambach Forest, which was supported by around 854,000 people. “(Bund für Umwelt und Naturschutz Deutschland, 2018, p.8). This survey showcased, that the level of attention was rising during 2018 and the FSM was successful in utilizing knowledge to get more public attention. Furthermore, the public support was showcased at the demonstration following the court ruling, which was attended by around 50 thousand people (Bund für Umwelt und Naturschutz Deutschland, 2018; Initiative Buirer für Buir, 2018d). During her speech at the demonstration, Antje Grothus, member of the coal commission and initiator of the initiative Buirer für Buir, highlighted “[i]t can be easy to defeat a giant when there are many of you.” (Grothus, 2018, p.2). The knowledge published to reach the target group, rising media attention

and continuous advocating for science-based solutions reached the public and marks the success of the knowledge utilization (Greenpeace e.V., 2019a; Greenpeace e.V., 2019b; Heise, 2018b).

This public support furthermore enhanced the knowledge utilization of the FSM within the coal commission (Grothus, 2019). When it came to finalizing the report of the coal commission, the FSM again tried to utilize their knowledge, but also showcase the public support towards environmentalism, to reach a fast coal phase out and protect the forest from deforestation (Greenpeace e.V., 2019a). One argument, which was bought up quite frequently in this context was the irony of not listening to experts and through this the FSM highlighted the previously introduced power clusters by Stoddard et al. (2021) (Scholz, 2018). RWE and the municipalities responsible for allowing the operation plans are actively ignoring science-based solutions to the problem climate change (Greenpeace e.V., 2019a). The FSM saw the coal commission as an opportunity to tackle the problem, which should be taken, especially considering that a quick coal phase out is needed to remain within the 1,5° C average global warming goal set in the Paris Agreement (Flauger et al., 2018; Greenpeace e.V., 2019b; Heise, 2018b). In the final report, the coal commission concluded that a coal phase out till 2038 should be pursued by the government and suggested to put a finance plan into place to support structural change in the affected regions (Bundesministerium für Wirtschaft und Energie, 2019; Groll, 2019). Moreover, “[t]he Commission considers it desirable that the Hambacher Forest be preserved.” (Bundesministerium für Wirtschaft und Energie, 2019, p.63) The initially set goal for a coal phase out is met, but the personal declaration by the FSM showcased the disappointment, that an earlier phase out was not decided on (Bundesministerium für Wirtschaft und Energie, 2019; Groll, 2019; Sadik, 2019a). Antje Grothus furthermore marks the lacking clarity in the statement towards the protection of the Hambacher forest (Bundesministerium für Wirtschaft und Energie, 2019).

Still, concluding from the report and political advocacy the German government implemented a new “Coal-fired Power Generation Termination Act”, which regulated the coal phase out for the Hambacher mine to be on the 31<sup>st</sup> of December 2029 (Gesetz Zur Reduzierung Und Zur Beendigung Der Kohleverstromung, 2022). Even though there is still no final decision on the Hambacher forest and if it is protected through the “Conservation of natural habitats and of wild fauna and flora” directive, deforestation is not allowed to continue (Bund für Umwelt und Naturschutz Deutschland Landesverband Nordrhein-Westfalen e.V, 2021; Grothus, 2019). To this day, the FSM is advocating for the Hambacher forest to become public property or to be

signed off to a foundation and nature restoration to take place to revitalize the forest (Grothus, 2019; Sadik, 2019b).

In conclusion, both initial goals are met even though the coal phase out is taking place later than wished and advocated for (Sadik, 2019b). This was done through the knowledge utilization process and the FSM fulfilled all the expectation formulated in the qualitative content analysis table. It must be marked that all of the fields of knowledge utilization interplayed, which was what made the FSM successful in its knowledge utilization. The judicial process stopped deforestation while the FSM was utilizing knowledge in the coal commission, which led to the decision towards a coal phase out in 2038 and pushed the protection of the forest (Bund für Umwelt und Naturschutz Deutschland, n.d.-b). Furthermore, the FSM was able to highlight the importance of environmentalism and sparked the public's interest in it (Greenpeace e.V., 2019b). In a poll by Greenpeace, "83 percent of respondents are in favor of the German government permanently preventing the clearing of the Hambacher Forest." (Greenpeace e.V., 2019b). Through this the Hambacher forest became a symbol of environmentalism and the power of social movements (Initiative Buirer für Buir, 2019).

## **6. Discussion and Limits**

In the following, limits of this thesis will be discussed.

One of the limits of this thesis is the framework, in which the study was conducted. Due to the feasibility of the paper, the focus was on the FSM instead of the whole movement and only a short time span was analyzed. This approach provided an overview over the general events and an in-depth analysis of the knowledge utilization was possible. At the same time, the conflict surrounding the Hambacher forest became extremely popular due to forest squatters, who were occupying the forest since 2012 and were evicted multiple times until 2018 (Bund für Umwelt und Naturschutz Deutschland, 2018; Mohr & Smits, 2022). The FSM acknowledges their role in protecting the forest as deforestation could not continue if people were still occupying the trees (Heise & Ballenthien, 2018; Weiland, 2018). This is also why the lack of analysis of the whole movement presents itself as one of the limitations of the study. A higher word count and longer time to conduct the analysis would have allowed a more in-depth analysis of the whole movement.

In addition to that, the method also brings disadvantages with it. A qualitative content analysis is conducted with the help of a predeveloped framework, which allows an analysis of a specific

phenomenon, but a broader and more interdisciplinary approach would have offered the opportunity to analyze more ways in which social movements can create change. To add to this, if the time and framework would have allowed it, interviews of members of the FSM could have given more insights in the knowledge utilization processes.

On the other hand, there are limitations in the impact of the FSM as the condition of the Hambacher forest is critical despite the stop of deforestation (Ibisch et al., 2019). The continuous deforestation of the Hambacher forest in the past decades and mining around it has caused side effects such as decreased ground water levels and high ground temperature (Ibisch et al., 2019). These and the general effects of climate change have weakened the forest to the extent where its viability is at risk and nature restorations is needed to ensure protection in long-term (Heise & Ballenthien, 2018; Ibisch et al., 2019).

At the same time the continuing mining without deforestation still showcases, that members of the Davos cluster, such as RWE, hold most of the power and environmentalism is not pursued fully due to vested interest (Grothus, 2019; Sadik, 2019b; Stoddard et al., 2021). This leads the FSM to raise the question, if goals such as in the Paris Agreement will be met with current and future policymaking (Deutscher Naturschutzring, 2019a; Initiative Buirer für Buir, 2019). Adding to this, social movements in general can and have caused major change in the past but change towards environmentalism is still too slow (Anderson & Calverley, 2022; Holt, 2023).

To summarize, a broader framework could have added depth to the analysis and offered the opportunity for more findings, while at the same time vested interest and power structures reduce the impact of social movements and slow down environmentalism.

## **7. Conclusion**

To answer the research question “How did the Hambacher forest movement utilize different types of knowledge to stop the deforestation in 2018?” a qualitative content analysis was conducted in consideration of the knowledge utilization theory.

This paper was based on the knowledge utilization framework developed by Hoffmann et al. (2019) and the first SQ was “What does the knowledge utilization theory tell us about transfer of knowledge into practice?”. According to this theory after the definition of a sustainability problem, new knowledge can be developed and evaluated to then be disseminated and utilized for political change (Hoffmann et al., 2019). This process covers the applications of intellectual

and practical knowledge to societal problems and practical issues citizens are concerned with are tackled through knowledge, which depicts the transfer of knowledge into practice (Hoffmann et al., 2019). Knowledge, either intellectual, practical or the combination thereof, has great recognition in society and can be translated into political pressure (Ottoson, 2009). This background was then used to answer the second SQ, “Which types of knowledge were used by the Hambacher forest movement? and the analysis highlighted intellectual and practical knowledge was used to create change towards the protection of the Hambacher forest and the German coal phase out. The combination of both knowledge types, so transdisciplinary knowledge, created a more robust framework for the FSM to utilize. To further evaluate the knowledge utilization process, the third SQ “How was this knowledge translated into political pressure?” was looked at and revealed that the FSM utilized knowledge in three different contexts: judicial, political, and public. This multi-targeted approach translated knowledge into political pressure as the FSM was able to showcase the irony of not following science-based solutions, while being backed in their political advocacy through further transdisciplinary knowledge, public support, and a favoring court ruling. Acting against this, would put the government at risk of losing its support. The last SQ, “What role did knowledge play in the success of the Hambacher forest movement?” can therefore be answered by stating that knowledge was essential for the protection of the Hambacher forest. A long-term protection solely through forest occupations was most likely not possible as multiple evictions had been taking place before 2018, which then allowed further deforestation. The commissioned studies and general engagement with knowledge production of the FSM backed its political position. Simultaneous, it was used to create as much public attention as possible while BUND filed a lawsuit against the operation plan from 2018 till 2020. The knowledge utilization was successful in both contexts, which furthermore supported the knowledge utilization in the political context. The FSM was able to enforce environmentalist demands in the process of the coal commission finding an interdisciplinary consensus for the German coal phase out.

These findings provide the answer for the main research question ““How did the Hambacher forest movement utilize different types of knowledge to stop the deforestation in 2018?”. The Hambacher forest movement relied on a multi-targeted approach by utilizing transdisciplinary knowledge in three contexts: judicial, political, and public. Increasing media and public attention concerning the Hambacher forest allowed the FSM to highlight the problems of the forest further and utilization of intellectual, practical, and transdisciplinary knowledge was possible, which caused the success of the Hambacher forest movement in 2018.

This study is of scientific relevance as it highlighted the multi-targeted and diverse approach the FSM took and this case study provided backing for the theoretical framework developed by Hoffmann et al. (2019). Both this and the analysis of the power structures in consideration of Stoddard et al. (2021) added to the existing body of literature, which mostly consisted of theoretical discussions. On the other hand, the power structures analyzed depict one of the limits of the study as even though the FSM was able to protect the forest from deforestation, the effects of the preceding deforestation, coal mining and climate change have weakened the forest where its survival is at risk. Considering this and the fact that the underlying problem, climate change, is not tackled extensively enough further decreases the impact of the Hambacher forest movement.

Still, this study provides a deep insight in the application of knowledge utilization and adds to the theoretical discussion. Besides the scientific relevance, the societal relevance is moreover given as actions towards environmentalism are still too slow and practical implications for social movements are provided. It would be of benefit to all if the climate crisis is tackled and as social movements depict a driver of change, the practical implications of developing transdisciplinary knowledge and utilizing it in the judicial, political, and public context can lead to success. Creating problem awareness through knowledge utilization in the citizenry can furthermore support the environmentalist demands of the social movements, which again would be a benefit for the whole of society (Chenoweth, 2022; Edwards, 2022).

Knowledge can and has therefore played a major role in the success of the FSM, at the same time the role of the unformalized part of the social movement should not be forgotten, which displays another limit of this study. The acts of civil disobedience, such as occupying the forests, created a window of opportunity for the FSM to execute the knowledge utilization. In consideration of the framework and feasibility of the paper a focus on the FSM was chosen, which restricted a more in-depth analysis of the whole social movement. Practical implications of this limitation are, that knowledge utilization can be very successful, but one should not be afraid to conduct acts of civil disobedience simultaneously to create change towards environmentalism (Capstick et al., 2022).

To conclude, this study showcased that knowledge utilization can be successful as long as an interdisciplinary knowledge is utilized in a multi-targeted approach. Furthermore, environmentalist social movements can use the findings of this study to improve their work and create change towards environmentalism.



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## Appendices

### 1. Appendix A: Documents used during the analysis

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## 2. *Appendix B: Declaration of Academic Integrity*

I, Maret Speemann, hereby confirm that the bachelor thesis "Between Knowledge and Power – A Case Study of the Hambacher Forest Movement" is the result of my own independent scholarly work, and that in all cases material from the work of others (in books, articles, essays, dissertations, and on the internet) is acknowledged, and quotations and paraphrases are clearly indicated. No material other than that listed has been used. I have read and understood the Institute's regulations and procedures concerning plagiarism.



Maret Speemann, 26.06.2023