water & land

The power of watermill landscapes for a climate-resilient future

Colophon

This brochure is the result of the project Water & Land. Intangible heritage and sustainable development. This is a three-year, international pilot project of the Centre for Agrarian History and the Dutch Centre for Intangible Heritage.

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For more information:
Laura Danckaert, Centre for Agrarian Historyvzw
Atrechtcollege, Naamsestraat 63, 3000 Leuven
laura.danckaert@cagnet.be
+32 16 37 21 90

Jet Bakels, Dutch Centre for Intangible Heritage
Hoeferlaan 4, 6816 SG Arnhem
j.bakels@immaterieelerfgoed.nl
+31 (0)26 35 76 113

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Introduction

Watermills often have a status as relics of the past, as important heritage sites or protected monuments located in a protected village environment or cultural-historical landscape. Today they are also often seen as places which create bottlenecks in the field of water management. However, that does not have to be the case, as became clear in the project 'Water and Land. Intangible heritage and sustainable development.' With their knowledge of the surrounding watermill landscape, water millers can play an important role in climate adaptation and current water challenges. And these challenges are great. Summers that are far too dry, groundwater levels that are far too low, floods and waterlogging: these are all phenomena in recent years which make it clear to us that water management is a very important challenge that we should pay great attention to today. Intangible heritage practices can provide new insights or inspiration here.

In this brochure we delve into the watermill landscapes and ask ourselves the question: **how can knowledge about the management of watermill landscapes contribute to a climate-resilient future?**

With this brochure we want to inspire more water millers to look at the mills from a new perspective, with nature management and climate adaptation as one of the basic functions of the water mill. In addition, we are targeting a broader audience which includes policy makers, nature managers, heritage experts and enthusiasts, all with the aim of familiarising them with the heritage of watermills in a different way, as well as to gain ideas and create collaborations, and to strive for a future-oriented heritage and nature management.

This brochure is a result of the project 'Water and land. Intangible heritage and sustainable development.' It is a three-year, international pilot project set up by the Centre for Agrarian History and the Dutch Centre for Intangible Heritage. Through this project, we want to investigate intangible heritage practices that can contribute to a climate-robust future, support heritage communities in safeguarding and visibility, draw policymakers' attention to the opportunities of heritage, and stimulate international exchange between heritage communities, experts, researchers and managers.

Intangible cultural heritage?

Intangible cultural heritage contains the habits, knowledge and practices that people have inherited from the past and would like to pass on to future generations. And as times change, intangible heritage evolves along with it. This dynamic nature makes intangible heritage ideally suited to teach us more about how we deal with changes, for example in climate. However, intangible heritage resides in the hands and minds of people. It is therefore not always self-evident to take care of this heritage, let alone to assign it an active role in climate challenges. In the Netherlands and Belgium, as elsewhere, knowledge and insights from heritage practices are still rarely included in decision-making processes. The separation in policy and science from culture and nature remains strong, with the latter receiving by far the most attention. That is why the Centre for Agrarian History and the Dutch Centre for Intangible Heritage are looking at intangible heritage together from a new angle and investigating the link with ecological sustainability.

Curious about intangible heritage in your area?
Be sure to take a look at www.immaterieelerfgoed.be
or www.immaterieelerfgoed.nl.

Image 1: Oyenbrug watermill in Grimbergen. © CAG 2023

The watermill and its landscape

Watermills have had a major impact on the landscape since the Middle Ages. Impounding water for milling changes both the level of the stream and the groundwater upstream from the weir. By damming, a waterfall is created, and the water wheel can be driven. This waterpower can then be used for grinding grain or pressing oil, for example. The water then flows further into the stream or river. These types of watermills are sometimes confused with polder mills, which are used to drain polders and are also sometimes referred to as watermills.

Waterpower was already used as a source of energy in ancient times, but the type of watermill found in our region mainly came into use from the middle of the 9th century. Gradually, different types of mills were developed, with either an undershot wheel, an overshot wheel, or what is known as a midshot wheel. The mills that have been preserved today give the impression that watermills were mainly used for grinding grain. But watermills also had various other functions, and served as oil mills, paper mills, and sawmills, amongst other practices. Watermills were used until well into the 20th century, some even grew into industrial companies (e.g. grain mills or paper mills). More recently, watermills were used to generate electricity. However, most watermills fell into disrepair or even disappeared during the 20th century, as steam engines and petrol engines became more widespread, and industrial mills were introduced, resulting in watermills becoming too small for the expanding growth of both the economy and the population.

Watermills in Flanders and the Netherlands

Watermills were once widespread. Flanders and the Netherlands accounted for thousands of windmills and watermills. However, after 1930 the glory days of the mills were over. Many mills disappeared or fell into disrepair.

A quick search through the Inventory of Immovable Heritage Flanders today gives 781 results of preserved watermills, with or without intact heritage values, with the search term ‘watermill’. Of these, approximately 400 are protected as monuments.

In the Netherlands, watermills were mainly found in North Brabant and Limburg, a search in the Dutch Monument Register yielded 228 results of preserved watermills.

Through the websites Molenecho’s (for Flanders) and Molendatabase (for the Netherlands) it is possible to look up both existing and disappeared watermills and to check the condition and grinding capacity of the mill. It turns out that in Flanders there are only about a hundred watermills that are still active for grinding.

Want to read more about the history of watermills?

- **Bauters, P.**, Van zadelsteen tot zetelkruier. Tweeduizend jaar molens in Vlaanderen, drie delen, Gent, 1998-2002.
- **Becuwe, F.**, ‘In de ban van Ceres. Klein- en grootmaalderijen in Vlaanderen ca. 1850 - ca. 1950’, Relicta monografieën, 3, Brussel, 2009.
- **Goublomme, A.**, Minnaert, P., Verpaalen, J., Verscheure, M. e.a., Molenland Vlaanderen, Deel 1. Historie verbeeld; Deel 2. Nu in beeld, Horebeke, 2008.
- **Heugten, W.**, Watermolens in Noord-Brabant, Utrecht, 2020.
- **Otte, E.**, Van den Branden, W., Van Royen, H., Molens in Vlaanderen. Technisch vernuft en vakmanschap, Gent, 2009.
- **van Halder, P-H.**, Watermolens in Noord-Brabant. Vroeger en nu, ’s-Hertogenbosch, 2010.
- Current titles of magazines about mills in Flanders: Molenecho’s, Vlaamse Molens, Levende Molens, Ons Molenheem

The construction of a watermill was accompanied by major human intervention in the landscape, such as the construction of more linear mill ditches and weirs. This gave the miller a larger and more regular source of energy for his water wheel. These interventions also created a mill pond and a higher water level upstream. In this way, a **watermill landscape** was created. These are wet and biodiverse landscapes, which were once common in Flanders and the south-east of the Netherlands. Watermill landscapes show what a wet environment can look like (again) and how it can be managed.

Today, watermill landscapes are special, because in many places we have made the soil suitable for other functions through drainage. But not at the watermills. There you can still see what the landscape can look like when it is soaking wet, even though it is an artificially wet landscape. They are relics of a situation that used to be everywhere.

— Hein Elemans, watercourse manager Waterschap De Dommel

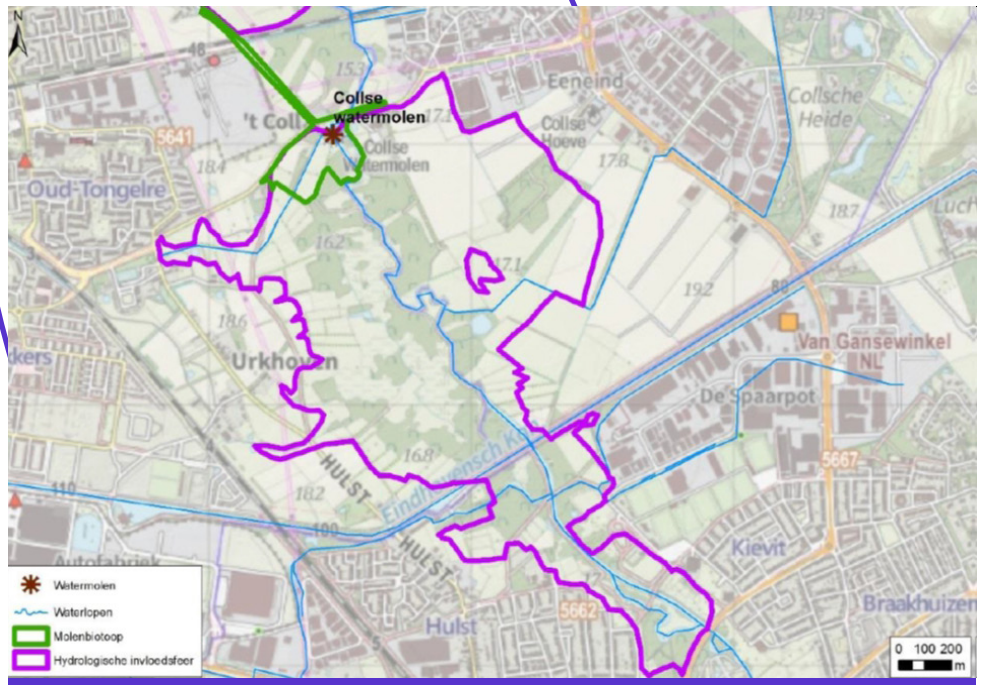


Image 2: The watermill landscape of the Collse Watermill, mapped in the Heritage Deal project 'Watermill landscapes for climate adaptation.' At the top of the map, the watermill landscape of the next mill is shown, the watermill of Opwetten.

Watermill landscapes are coherent, scenic wholes and comprise a number of elements: the watermill itself with its associated weir, the related surface waters such as the stream, ditches and slate canals (these elements together form the mill biotope, outlined in green in image 2), and the wider upstream area influenced by the backwater (outlined in purple in image 2). The landscapes that are often regarded as natural today owe that appearance to the often centuries-long presence of the mill.

Such a watermill landscape, connected to one mill, can be up to 150 hectares in size and can take on various forms. They can be landscapes with a natural appearance, with wet swamp forests and marshes, as well as those with more human activity where hayed grasslands or cultivated grasslands litter the landscape. Especially in the latter case, when cultivated grasslands take over, the mill landscapes have in recent decades changed significantly from their historical form, and a lowering of the weir level has often taken place. These are called deteriorated mill landscapes. Many watermill landscapes have ended up in that phase due to reclamation, drainage, industrialization and the scaling up in agriculture. Nevertheless, they have always been traditionally very suitable 'sponge landscapes' that can retain water. This is an important function in current climate challenges where we are faced with more peak discharges and extreme drought (Bleumink, de Mars, de Vries-Oosterveen, Sturkenboom, 2019).

The watermill may have less economic value today, but it does have greater landscape and social value. Watermills contribute to the recognisability and identity of a landscape or region. They have traditionally been locations of connection and interaction, and to this day they form a social binding agent, as a crowd puller, as a location for activities, or as the core of a network of volunteers. In addition, they offer many opportunities in the field of ecological sustainability, water management, and climate adaptation.

Image 3: The watermill in Coll with wet grasslands © CAG 2023

Water millers in Flanders and the Netherlands

A water miller is constantly occupied with the watercourse and the surroundings of his mill. Today, many watermills and the associated weirs have disappeared or are inactive. Nevertheless, watermills can play an interesting role in local water management, and it is therefore important to appreciate the knowledge of the water miller.

In the Water & Land project, we worked together with a number of millers from Flanders and the Netherlands, affiliated with the Molenforum, Levende Molens en Molenstichting Noord-Brabant. In both Flanders and the Netherlands, hundreds of watermills have been preserved, although not all are in working condition anymore. They are often protected as monuments and located within a protected village view or cultural-historical landscape. The craftsmanship of the miller has been added to the Inventories of Flanders and the Netherlands, and thanks to the Netherlands categorizing it, it has now been recognized by UNESCO on the Representative List for the Intangible Cultural Heritage of Humanity.

Millers in Flanders

Flanders has only about ten professional millers and over three hundred active volunteer millers, most of whom work at windmills (figures in 2020). In Flanders, these millers are organised in various associations. For example, there are the umbrella associations Molenforum Vlaanderen, Vlaamse Molens and Levende Molens , which operate actively throughout Flanders and organise miller courses. The NGO of Molenzorg coordinates the Belgian Mill Database, and there are various provincial and local associations that are committed to safeguarding both mill heritage and intangible heritage in Flanders.

Millers in the Netherlands

In the Netherlands, the number of active professional millers is currently estimated at around forty, but there are more than two thousand active volunteer millers. These figures apply to both wind and water millers. The Netherlands also has a number of miller associations. For example, there is the Gilde van Molenaars (Gild of Millers), which unites (volunteer) millers and millers in training throughout the Netherlands. The foundation De Hollandsche Molen is an interest group that is committed to mill heritage, while the Stichting Molendatabase, as its name suggests, coordinates the Dutch Mill Database. In addition, there are various provincial, regional and thematic associations and mill foundations that are committed to Dutch mill heritage.

Sustainable watermills

> *Mills have harnessed energy and natural resources for centuries. This is not only significant heritage, it is also so important to society that we should not forget it. And we can use the mill today in all sorts of ways.*
>
> — Erik Van Hemelrijck, miller

There are several obvious sustainable applications for watermills, such as using waterpower for grinding, or using it in a short supply chain or in local (bio)agriculture. Watermills generate energy, in line with heritage values, although this does require the constant use of a weir, which is not possible or desirable everywhere. In addition to these, there may even be more important opportunities in the smart use of the watermill's weir effect and in making use of the watermill landscape. An often centuries-old damming right and a fixed water level are a determining factor for a water mill. This results in a very specific, wet landscape.

The miller's knowledge about managing the weir and the impact on the surrounding landscape has been passed down from generation to generation. Today, this knowledge can be used to contribute to the sustainable management of the wet environment around the mill. Such a 'new' function for the mill can also bring about better protection for both the mill and the landscape in the long term. It is already the case today that watermills located on or in nature reserves must observe a number of rules, must follow the Habitats Directive, and must be given a purpose that has no negative effects on nature (e.g. a visitor centre).

Image 4: Miller Erik Van Hemelrijck at work in his Oyenbrug mill in Grimbergen © Willem Tel. 2023

The purpose of the watermill in the past was not to wet the valley and dam it up, but it could be today.

— Patrick Meire, professor of Ecosystem Management

Watermill landscapes are vital for further study on rewetting and water storage. By doing so, it is first important to map these mill landscapes and to make clear which (natural) area is inextricably linked to the watermill and the weir. Hans de Mars, ecohydrologist affiliated with consultancy and engineering firm Royal HaskoningDHV explains: "Mapping mill landscapes is relatively easy to do. What comes after that is many times more important. The coherence of things must be monitored. It is important to keep an eye on where the effects of the possible use of windmills will manifest themselves."

Restoration of such a watermill landscape does encounter a few difficulties, both for the miller and the watercourse manager. Essential is the good management of the weir, often by the miller, though in some mills it is (partially) taken over by the watercourse manager. This also allows weirs – whether automated or not – to retain the historical weir level even if the mill has fallen into neglect and the wetting effect on the valley is not lost. In some places, however, the mill weir has disappeared or has not been in use for decades. Rebuilding weirs is difficult in such locations, partly because the former wet mill valley may sometimes have acquired other functions, such as housing. It is also very important for future spatial implementation plans to know the locations and spheres of influence of watermill landscapes, and whether they have become dilapidated over time or have even disappeared entirely. As ecohydrologist Hans de Mars says: "If you plant a residential area in the middle of it, then it is all in vain. Then you will never be able to keep that residential area dry without large constructions."

In the area of nature management also, restoration of the weirs for the use of watermill landscapes is difficult. Certain fish and plant species need fast-flowing and low water, which is not possible with the mill weir. Free fish migration is a major holdup, as it is currently one of the objectives of an integrated water policy. Solutions such as fish ladders or a bypass make (temporary) fish migration possible once again, although does have an effect on the weir level of the mill. In addition, irrigation water is regularly pumped out of the watercourses during dry periods, which prevents the mill from pumping and grinding.

Fish migration at watermills

Fish are constantly moving in our waterways. They are looking for food, breeding grounds, wintering places or new habitats. Dams, such as those at watermills, prevent free fish migration. That is why solutions are increasingly being sought to make this fish passage possible. This can be done by restoring the natural situation of the waterway, but that is no longer possible in many places. Fish ladders or other passages are then constructed. These exist in all shapes and sizes. For example, for the passage at the Hooidonkse watermill near Eindhoven, a passage was chosen that requires little flow, in order to hinder the functioning of the watermill as little as possible.

You can read more about this fish migration, possible passages and recovery measures on the website of the Vlaamse Milieumaatschappij or in the publication 'Fish migration. A manual for recovery in Flanders and the Netherlands.'

Image 5: ' Vertical -Slot' fish passage at the Hooidonk watermill, from Wouters, F., 'Visual & hydraulic research of fish passages for the De Dommel Water Board', 2012.

To actively use the watermills for rewetting the environment, it is emphasized that a combination of various nature objectives and the European Water Framework Directive is important. "A miller has the right to dam, but no exclusive right to the water", says Hans Nuyttens, watercourse manager at the Vlaamse Milieumaatschappij. The restoration of a watermill landscape is therefore still a rarity, because possible opportunities are still too little known among both millers and watercourse managers. In addition, you need to know the watercourse in question well enough, as each watercourse has its own peculiarities, such as flow rates and discharges, and soil types, among other things, and this all needs to be considered. A watermill river, with various dams, is therefore best managed by focusing on the level of each dam, even if some of the watermills are no longer active.

The Water Framework Directive

The Water Framework Directive is a European directive that was introduced in 2000 to improve the water quality of European waters, to secure water supplies and to mitigate the effects of drought and flooding. This European directive is incorporated into national, regional frameworks and policy texts in Flanders and the Netherlands, e.g. the Flemish decree on Integrated Water Policy.

Want to know more about this Water Framework Directive?

Check out the website of the decree 'Integraal Waterbeleid', the website of the Vlaamse Milieumaatschappij, and the website of the Rijksinstituut voor Volksgezondheid en Milieu.

Image 6: Cuckoo flowers in the wet meadows near the Collse watermill © CAG 2023

Inspiring examples

Erfgoed Deal project ‘Watermill landscapes’

In 2019, the Erfgoed Deal (Heritage Deal) was launched in the Netherlands, a partnership between the national government, municipalities, provinces and social organisations active in spatial planning and heritage care. The programme offers financial support to projects in which heritage can play a role in spatial changes. One of the projects that was approved in 2019 was the project ‘Watermill landscapes for climate adaptation’ (2020-2023). It is a very good example of how a watermill can be valued and respected without losing sight of nature objectives and fish migration, but it does mean that compromises had to be made on both sides.

At three watermills, the historical landscapes were investigated and prepared for use in water buffering and storage. More specifically, this concerns the Venbergse, the Opwettense and the Spoordonkse watermill. Here, at least 300 to 400 hectares of stream landscape will be created, including extra space for water storage in wet periods, and water retention in dry periods. These implementation projects are accompanied by supporting knowledge development, networking, and an exchange of that knowledge.

The mills involved, the (historical) watermill landscape, the water management, and the historical-ecological values were all recorded in extensive watermill passports. Long gone watermills and their landscapes were also mapped and studied for any possibilities they might still offer in spatial assignments. The most important recommendations from the final report point to the importance of cooperation and knowledge sharing, mapping watermill landscapes, and drawing up more watermill passports, as well as the need for further research.

The project is an excellent example of how (intangible) heritage can play a role today.

MolenNetwerk KempenBroek

The KempenBroek nature reserve on the Belgian-Dutch border still contains 47 windmills and watermills, of which about twenty are still active. In 2015, the volunteer organization MolenNetwerk (MillNetwork) KempenBroek was founded to promote and preserve this rich mill heritage, which acts as a magnet for not only visitors, but also for nature, culture and heritage.

Sustainability is the main objective and has been from the very beginning: "Windmills and watermills have been the basis of sustainable action for centuries. When building the mills, the reuse of building materials (wood) was self-evident. The mills were also the first machines to use sustainable wind and water energy, something which they still do today. Using a mill for production is therefore synonymous with sustainability, they are the perfect example of this, places which embody the ethos of sustainability, of responsible energy use, of the use of wind and water energy, of reusable raw materials, and of biodiversity."

In 2023 the MolenNetwerk was added to the Register of inspiring examples of safeguarding intangible heritage in Flanders. This register brings together examples which can inspire others to cherish, share, and pass on their own intangible heritage. For the Water & Land project, we would also like to highlight the network as an example in which the crucial, holistic view of landscape, nature and heritage is used.

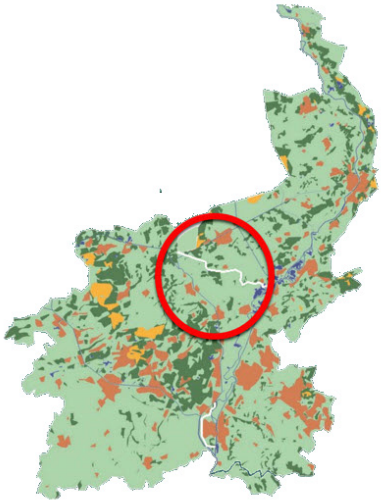


Image 8: Location of the KempenBroek park, on the border between Belgian Limburg, Dutch Limburg and North Brabant

You can read more about the MolenNetwerk Kempenbroek on their website.

Want to read more?

Want to read more? Check out the website of the Erfgoed Deal and the project 'Watermill landscapes for climate adaptation.' There you will also find the publication 'Pilot Watermolenlandschappen in Het Groene Woud. Toekomstkansen voor watermolens' by Hans Bleumink, Hans de Mars, Akke de Vries-Oosterveen and Gerard Sturkenboom .

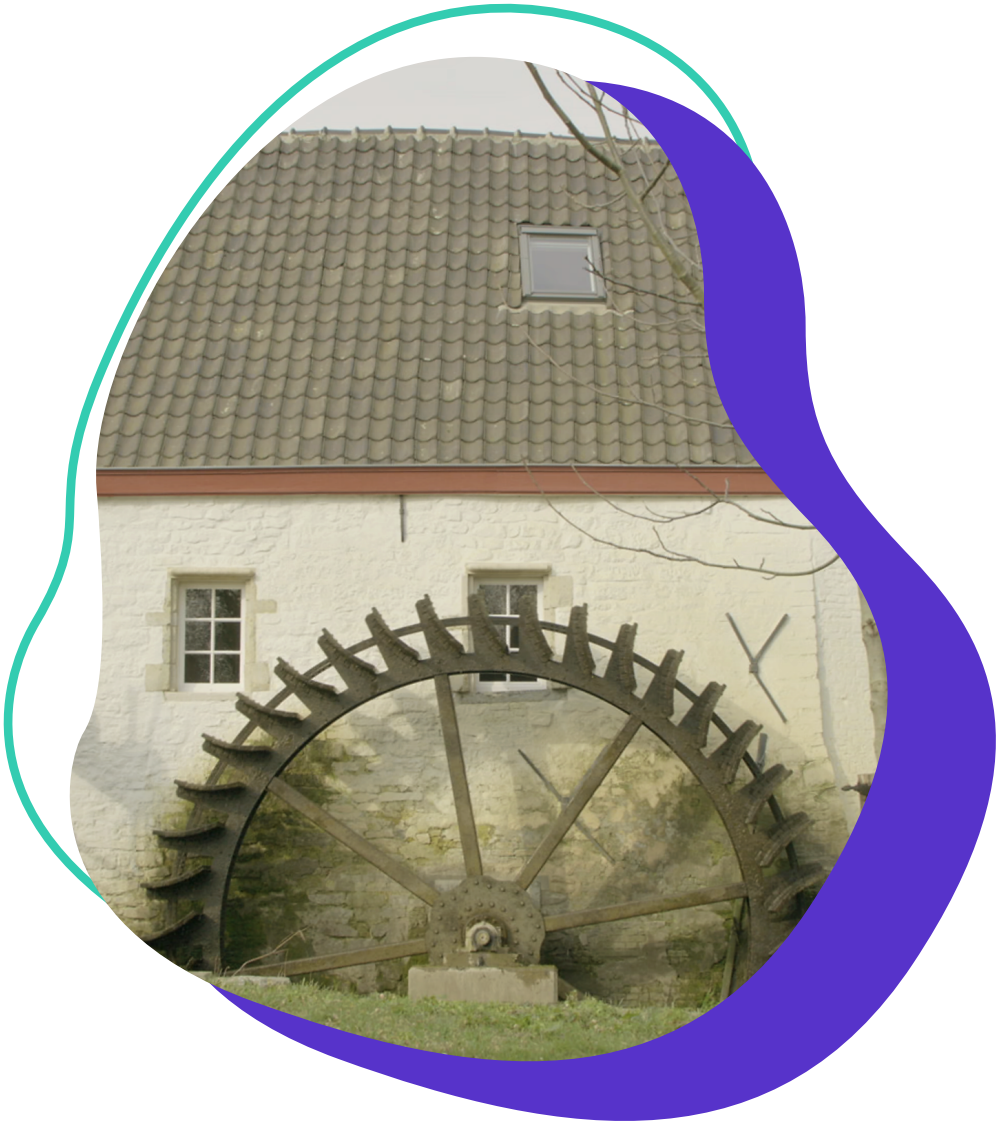


Image 9: Oyenbrug watermill in Grimbergen © Willem Tel. 2023

Opportunities and challenges

Today, we face many challenges in the areas of sustainability and climate, spatial planning and social issues. From the 'Water & Land' project, we are convinced that intangible heritage can contribute to the necessary climate transition. Intangible heritage practices, such as the craftsmanship of the miller, have always been adaptable to the ecosystems and environment in which they function. The management of watermill landscapes is an example of a dynamic, solution-oriented system of local water management. The craftsmanship has been shaped by the environment through decades of 'trial and error' and has also shaped the environment itself.

Much of the intangible heritage and knowledge of water practices still exists today, but only in the minds and hands of a few. And in today's fast, technological and urbanized society, that heritage is threatened. In combination with a different precipitation pattern that contains more peak flows, this knowledge of heritage communities is no longer sufficient for today's water needs. But still, examples such as the management of irrigated grasslands remain interesting practices and are areas which we need to safeguard and maintain, simply because they do make important contributions on a small scale.

The opportunities are therefore great, but the challenges are just as great. In order to be able to use intangible heritage as a lever in climate issues, there are four major focal points of attention:

- Need for a change of mentality
- Co-production as a key word
- Need for policy and good examples
- Substantiate with further research

Working on a change of mentality

The landscape has been shaped by water and soil for centuries. Watercourses and soil composition used to determine the landscape appearance, and still do. A fertile soil and the presence of water brought about habitation, with the associated water management and land use. People and landscape have influenced each other throughout history, in what we call 'ecosystem services' today. These are benefits (services) that we as humans receive from nature and the environment (ecosystems). Dr. Jan Staes, from the Ecosystem Management research group at the University of Antwerp, explains: "The landscape and the patterns

today are the result of ecosystem services from the past. The landscape is structured by water and soil. But the ecosystem services that the landscape provides are not necessarily the same now as it was in the past." Heritage practices are also connected to various ecosystem services, a connection that is not obvious to many ecologists, hydrologists, biologists, geographers, etc.

Ecosystem services at watermills

Ecosystem services are benefits (services) that we as humans receive from nature and the environment (ecosystems). Think for example of pollination by wild insects, food production, natural flood protection, or green environments for recreation.

There are three major groups of ecosystem services:

- Producing ecosystem services: Ecosystems provide products such as food, drinking water and raw materials.
- Regulatory ecosystem services: These services are more supportive, less visible and work in the background. Ecosystems regulate certain processes such as climate and water quality, CO2 storage... Often there are still opportunities in these services to strengthen them.
- Cultural ecosystem services: These are life-enhancing natural benefits that make our lives healthier, more pleasant and more interesting. For example, a green living environment, nature-related recreation, and landscape heritage have a positive influence on our quality of life.

A watermill landscape can also provide us with many of these ecosystem services. On the one hand, these are regulating services, such as water storage, water buffering and thus flood control. On the other hand, many cultural services are important, such as green environments that encourage movement and relaxation, and especially that these watermill landscapes and the water millers form an important source of knowledge.

Image 10: Watermill landscapes provide many regulatory (purple) and cultural (green) ecosystem services

Over the past century, we have increasingly shaped the landscape to our liking, based on the feasibility of nature. However, we are now reaching the limits of that idea. Today, we have a landscape that is drying out rapidly, one that is simultaneously exposed to more rainfall in shorter periods. The water system is not adapted to this. A turnaround in our approach to the landscape is therefore necessary, one which begins with deciding what is feasible and then putting our minds to actually doing it, and which then moves to a landscape approach with an increased focus on the importance of ecosystem services and water and soil-driven thinking. However, at the moment, this is not self-evident.

In the past, people took more account of the environment. Today and for the last 70 years, people adapt the environment to their own wishes. Certainly, in the area of water management, this has led to problems that still exist today. A change in mentality is needed.

— Patrick Meire, professor of Ecosystem Management

A change of mentality with attention to a landscape approach is therefore necessary. Intangible heritage, such as the practice of the miller, can play a role in such a change of mentality, because it contains a whole range of ideas and inspiration. Or as watercourse manager Hein Elemans clearly explained: "The best thing is that watermills are a very tangible, tactile asset. A watermill appeals. **It is also a location where you can show society how water management and nature development flow into each other, how people used to use water...** It is a place to tell the story of water. That is perhaps even more important than the fact that the watermill contributes to the restoration of the landscape at that location." Heritage can connect people and nature in this way. For water millers themselves, it also applies that actively working in and with the landscape and the water gives a feeling of connection with nature.

A deep connection between man and nature is sometimes referred to as eco-citizenship; an ecological awareness of belonging to an environment. Not without reason, this is seen as an important motivation for so-called 'pro-environmental behaviour' and changes in lifestyle, more so than policy instruments do in that it increases support for climate measures. Certainly, when policy creates a link with a geographical identity, (intangible) heritage can be the catalyst for change, creating new goals in local projects, rather than creating delaying tactics or even obstruction, as is so often the case. This has also been confirmed in the Dutch UNESCO Commission by chair Kathleen Ferrier.

A change in mentality, about heritage and about a different approach to the landscape, is a long-term project. What can be done to bring about a new perspective on heritage and landscape? In the Water & Land project, we highlight a number of intangible heritage practices with opportunities for climate challenges. Heritage communities, heritage organisations, regional landscapes, etc. can also help to put intangible heritage in the spotlight from a sustainability perspective, through activities, documentation processes, and other action. This can also help to grow eco-citizenship among local residents. Connectedness between people and nature can contribute to a different approach to the landscape.

When climate adaptation is based on local traditions and practices, it empowers local communities to take matters into their own hands and initiate change. It also helps to involve citizens in decisions on climate adaptation, which increases support for policy decisions.

— Kathleen Ferrier, Chair of the Dutch UNESCO Commission

Co-production as a key word

Looking to the past is not always a logical step for policymakers and watercourse or landscape managers, Hein Elemans explains: "Organisations such as the Water Board will look ahead more than back. Climate is the current problem that is being worked on, we strive for social progress instead of looking to history as a beacon." However, the knowledge of heritage communities can supplement the information about climate and environmental changes with important local insights. Knowing how the landscape was used in the past and how it was formed helps to restore and design it sustainably.

Involving local communities is not new, however. For example, Dutch farmers were initially well represented in the Water Boards, but their influence decreased as agriculture became more specialised and large-scale urbanisation took place, allowing the Water Boards to grow into important administrative bodies. Today, such collaborations are less or even non-existent, and local knowledge is hardly included. After all, within water management organisations, the focus is mainly on water purification and the management of watercourses. In this respect, a historical perspective is not obvious or even desirable. The focus is on the future and not on the past. However, in the landscape management function that watercourse managers also fulfil, this historical perspective can be valuable. An integral and holistic approach that establishes connections over time and across sectors can provide new insights.

> *There is a lot of knowledge in many different fields, but sometimes there is a lack of searching for connections.*
>
> — Hans Nuyttens, watercourse manager

The point is to link objectives in the areas of nature, heritage and watercourse management. "The problem with watermills is of course the fragmentation they cause, and fish migration is a real bottleneck," says professor Patrick Meire. "But at the same time, you also want to be able to retain water and whether that is done by watermills or by modern weirs, that does not matter. Linking these objectives is therefore a possible path."

In the Erfgoed Deal project 'Watermill Landscapes', such a collaboration between many different partners was achieved. To this end, they drew up a clear step-by-step plan to unite all these different parties, with sufficient attention to how the plan would mean added value for all partners. Arjan Conijn, postdoctoral researcher of 'Living dikes' at the University of Groningen, and expert in 'landscape, water and heritage' at consultancy and engineering firm WitteveenBos, also emphasises this idea: "From a management perspective, starting from the heritage point of view seems less promising. That is why it is important that we look at the climate challenges from a heritage perspective in order to find solutions, demonstrate their added value, and limit disruption."

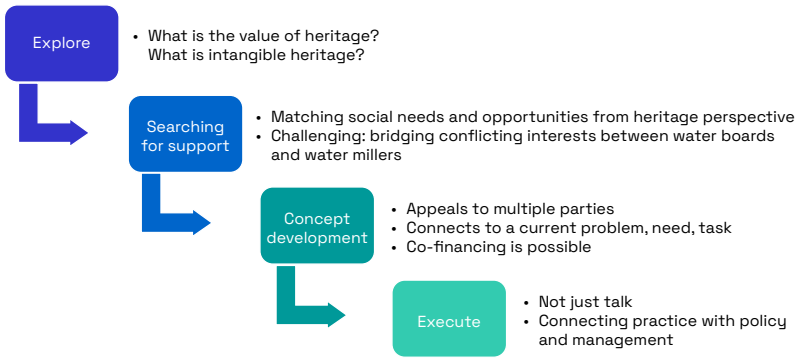


Image 11: step-by-step plan from the Erfgoed Deal project Watermill Landscapes

Watercourse management in Flanders and the Netherlands

Important partners for heritage communities, such as grassland irrigators, are the watercourse managers. In Belgium, the federal government, the

regions, the provinces, the municipalities, the Wateringen, organisations for water purification and drinking water supply, the Vlaamse Milieumaatschappij, etc. are all involved in watercourse management in one way or another. For the non-navigable watercourses in Flanders, there are currently 112 managers: 50 municipalities, 56 Polders en Wateringen, 5 provinces and the Vlaamse Milieumaatschappij. In July 2023, it was announced that there are plans to reduce these managers to 12 Water Boards. This is a similar setup to water management in the Netherlands. There, in principle, almost everything comes together in one place, the Water Board, which is responsible for quantity, quality, and purification. However, the largest canals do fall under the authority of the Rijkswaterstaat.

Who does what in water policy?

For Flanders you can find this information on the website of the Coordination Committee for Integrated Water Policy, in the Netherlands you can find this information on the website of the Rijksoverheid, 'Ons Water.' In the document Waterbesturen of the Union of Water Boards, you can read more about the tasks of the Dutch water boards.

At least as important is that co-production of knowledge becomes possible. Heritage communities can share their knowledge in this way and feel involved in a sustainable, future-oriented area development. At the same time, policymakers can also share their suggestions, both positive and negative, in deciding together whether to assign a role to heritage or not. In the Watermill Landscapes project, such knowledge networks and knowledge sharing are central. "We want to visualize knowledge, map things out, and share it as well," says Riet Meijer.

To sum up, setting up networks is an important step to realising co-production. By involving local heritage communities in the process of landscape management plans or spatial development, the possibilities of heritage (both intangible and immovable) can be included from the very beginning.

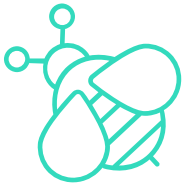
Best practices and theoretical frameworks as inspiration for policy

The connection between sustainable development and heritage is still in its infancy, and making this link known to policymakers, professionals, and the general public is urgently needed. Firstly, best practices and visionary objectives can help in this. Inspiring projects in which an all-encompassing vision is pursued, and concrete results are demonstrated can contribute to a cultural shift. We previously spoke of a few inspiring practices, such as the Erfgoed Deal project 'Watermill landscapes for climate adaptation' and the vzw MolenNetwerk KempenBroek. It is vitally important that these kinds of all-encompassing projects are made possible, simply because we have lost sight of the coherence of various elements within the landscape in recent decades.

In addition, conceptual frameworks such as the Biocultural Heritage Framework can help to change the mindset, stimulate policy makers to implement participatory management, and facilitate a different view on landscape, heritage and projects. The Biocultural Heritage Framework consists of five elements, which are interconnected and together create the conditions for resilient societies: biodiversity, landscape, local knowledge, participatory management, and finally cultural, social and economic values. The framework can be used as a tool:

- To see how the different elements that lead to resilience are present in Flemish or Dutch policy
- To open the conversation about gaps in that policy, or the total absence of heritage as an actor

During the first year of the 'Water management' project, a start was made on testing policy instruments against this framework. The five elements of the Biocultural Heritage Framework are all present to a greater or lesser extent in Flemish, Belgian, Dutch, and European policy. In the coming years, the project will continue to examine vision and policy texts through the lens of this framework, looking for pegs to hang heritage on. And at the end of this project, we will share these results publicly.



Substantiate with research

Studying intangible heritage is often crucial in understanding water systems and watercourse management from the past. Knowledge about the historical landscape and historical water management can contribute to the development or maintenance of special natural values. After all, some ecological values are related to these same practices, such as the high biodiversity in irrigated grasslands. Knowledge of the practice and its local impact is mainly in the hands and minds of the heritage bearers. The fact that this knowledge is both practical and intangible sometimes makes it difficult for managers and policy makers to grasp, and it is rarely included in the current management of ecosystems and watercourses. In addition, this historical knowledge is not always taken seriously. Watermill owner Riet Meijer also experiences this, but she emphasizes: "By what you see and the explanation you give to it – and think 'maybe it can be smarter, better' –, you can provide input, even if you are not an ecologist."
Moreover, it is not only about the biological and ecological influence of heritage, but also about the identity formation and social aspects that are related to the heritage practice. New research into water history and heritage can therefore offer a source of information, inspiration and identity formation, relevant for the redevelopment of areas, and for spatial planning with attention to old and new systems. It would be interesting to map other watermill landscapes in Flanders and the Netherlands, as was done in the Erfgoed Deal project 'Watermill Landscapes.' Ecohydrologist Hans de Mars explains that this is only the first step: "Mapping mill landscapes is not such a big job, it is relatively easy to do. What comes next is much more important, namely how do you frame it? How do you make people more aware of the importance of the connection between the mill landscape and the mill? How do you get that between their ears, how do you get people around the table to jointly develop the area? That is what it is mainly about. The map is important to generate enthusiasm to work together on the development of the area".
In addition, history can also provide us with specific ideas for adaptations in a changing environment. If the groundwater level needs to be raised and areas need to be rewetted, historical research into the agricultural past in wet areas can provide information about varieties and species that thrive there. Historical research can help us understand why certain solutions such as mills, dams and weirs were developed in the past and why certain choices for water management were made based on geophysical, economic or cultural circumstances.

In the Water & Land project, we will continue to collect research questions and themes during the course of the project to encourage universities to conduct more research into the leverage function of intangible heritage. For example, it may be interesting to further map former floodplains in Flanders and the Netherlands, or to conduct historical-ecological research into the influence of evaporation on water management. Local history societies or heritage organisations can also conduct research into intangible heritage practices in their environment, into agricultural history, and old practices.

Image 12: The watermill of Opwetten © CAG 2023

Get started

The incorporation of intangible heritage in development, management, policy and research requires a new perspective. It challenges conventional thinking patterns and established values. For example, people often see a watermill only as a protected monument, possibly with bottlenecks in terms of water management. But by seeing the mill in its landscape and its social and economic significance, new possibilities are feasible. The watermill landscapes can be crucial in climate adaptation and water issues. Before new weirs are built, it could be useful to take a closer look at the existing weirs of watermills.

Intangible heritage can therefore make a significant contribution to a sustainable and climate-robust future. **Do you know of any intangible heritage practices that are connected to water and land? Please let us know!**

Are you excited to get started yourself? Here are some recommendations.

- **Map sustainable intangible heritage practices.** See which practices are practiced in your (work) surroundings and how they could contribute to overcoming climate challenges. Do these practices connect with (local) climate or environmental objectives? Or do you yourself practice heritage that can contribute to climate issues? Make the practice visible, for example by registering on immaterieelerfgoed.be or immaterieelerfgoed.nl
- **Open the conversation with potential partners**. Collaboration and co-production are crucial, as we have learnt in the Water & Land project. Find out who could be interesting partners and think about the benefits of involving heritage for each of those partners. What common interests do you share?
- **Document and research practices** further from a historical, ecological, biological, hydrological... point of view. The more we learn about these practices, the better. Search local archives and literature for the history of a watermill, or as a biologist, ecologist, geographer... put on a historical lens.
- **Make policymakers, nature managers, local communities, young people enthusiastic** about this climate-robust heritage. Heritage works as a connection, between people, and between people, nature, culture and landscape. By making people enthusiastic about (local) intangible heritage, the safeguarding of intangible heritage practices can be helped.

Image 13: Oyenbrug watermill in Grimbergen © CAG 2023

Read more

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Interesting links

Coördinatiecommissie Integraal Waterbeleid, 'Wie doet wat in het Vlaamse waterbeleid'

Erfgoed Deal Nederland, website Erfgoed Deal

Erfgoed Deal-project 'Watermolenlandschappen', website 'Watermolenlandschappen voor klimaat-adaptatie'.

Gilde van Molenaars, website Gilde van Molenaars

Integraal Waterbeleid, Europese Kaderrichtlijn Water

Levende Molens vzw, website Levende Molens

Molenforum Vlaanderen, website Molenforum

MolenNetwerk Kempenbroek, website MolenNetwerk

Molenstichting Noord Brabant, website Molenstichting Noord-Brabant

Molenzorg vzw, website Molenzorg

Ons Water in Nederland, 'Wie doet wat?'

Rijksinstituut voor Volksgezondheid en Milieu, Kaderrichtlijn Water (KRW)

Rijksoverheid, 'Waterbeheer in Nederland'

Stichting De Hollandsche Molen, website De Hollandsche Molen

Stichting Molendatabase, website Stichting Molendatabase

Vlaamse Milieumaatschappij, Europese Kaderrichtlijn Water

Vlaamse Milieumaatschappij, Vismigratie

Vlaamse Molens, website Vlaamse Molens

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On the website www.waterenland.be you will find more information, concrete tips and project results. What do heritage bearers themselves say? And what do experts think? Listen to the podcast series Water & Land or watch the videos.

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