water & land

Traditional grassland irrigation 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.

Front page image: water meadow in Het Lankheet © Eric Brinckmann Collection, 2011.

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A digital version of this brochure is available at

www.waterenland.be

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Inhoud

Introduction

Traditional grassland irrigation is still practiced as an agricultural and fertilization technique by some heritage communities in Belgium and the Netherlands. Although the irrigation of meadows is generally seen as a technique from the past, it is actually more relevant than ever today. Water meadows can play an important role in climate adaptation and in current water challenges.

And these challenges are great. Summers that are far too dry, groundwater levels that are 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 be paying great attention to today. Intangible heritage practices can provide new insights or inspiration in this area.

In this brochure we explore the practice of traditional grassland irrigation and ask ourselves the question: **how can knowledge about water meadow management and grassland irrigation technology contribute to a climate-resilient future?**

With this brochure, we want to inspire grassland irrigators to look at their heritage practice in a more climate-oriented way. In addition, we are targeting a broader audience of policy makers, nature managers, heritage experts and enthusiasts, all with the intention of familiarising them all with the immovable and intangible heritage of the water meadows in a different way, as well as developing ideas and creating partnerships to strive for a more future-oriented heritage and nature management.

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 immaterieelerfgoed.be or www.immaterieelerfgoed.nl.

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.

Image 1 : Aerial view of the Grote Watering in Lommel-Kolonie, © Nico Vande Kerkhof, 2018.

Traditional grassland irrigation

Irrigating grassland is an age-old agricultural technique in which flowing water is led to the grassland through ditches and channels with the aim of promoting growth and increasing hay yields. Only gravity and natural flow are used. Irrigation is mainly done in winter and spring. It prevents freezing, combats pests, improves soil structure, and supplies mineral-rich sludge.

In large parts of Europe, grassland was irrigated from the early Middle Ages until well into the twentieth century. There were four methods that were used on a large scale in Europe, whether adapted to the local situation or not: overwatering or submergence, infiltration, mid-mountain or slope irrigation, and lowland irrigation via bed constructions.

In the case of submergence or flooding, also referred to as water meadows of the 'volveld-type' (full-field type), a grassland was flooded in a short period of time, with the intention of allowing sludge to settle. In the case of the infiltration technique, the meadows were lightly sloped and divided into smaller plots using ditches, along which the water seeped horizontally into the soil. Mid-mountain irrigation occurred on steeply sloping plots with several ditches, where the water flowed to a lower ditch each time. Finally, there was the nineteenth-century type of water meadow in bed construction, in which the grassland was laid out in beds or ridges, with a ditch at the top of the ridge, through which the water flowed down on both sides.

> *Although irrigation is sometimes seen as a technique of the past, communities are actually working on very topical things.*
>
> — Eric Brinckmann,
> manager at Het Lankheet

Image 2 : Today, examples of the different types of water meadows can still be found in Europe: submergence (top left - Eric Brinckmann), infiltration (bottom left - Christian Leibundgut), slope irrigation (top right - Christian Leibundgut), bed construction (bottom right - Albert Jansen)

In the Middle Ages, many water meadows were created and described in written texts, often under monastic order. It is known that the Cistercians played an important role in spreading the technique, but it was mainly farmers who created these water meadows out of necessity. Irrigating meadows was originally a form of fertilization. The flowing water, rich in oxygen, deposited moisture, minerals and silt between the roots of the grass, thus promoting growth. The technique was also used to bridge dry summer periods and to warm the soil in the winter months (the water was warmer than the soil in the autumn and spring). In addition, the soil quality improved and pests, such as moles and mice, could also be controlled.

The introduction of artificial fertilizers and the use of modern, heavier agricultural machinery that required a drier subsoil meant that the technique fell into disuse in the second half of the twentieth century. There are only a few locations in Europe, including Belgium and the Netherlands, where grassland irrigation is still actively practiced. This is done – certainly in the Low Countries – from a cultural-historical perspective, but also an ecological one. After all, irrigation produces grasslands that are characterized by their biodiversity. They have become areas where old agricultural practices now go hand in hand with nature development and conservation.

In addition to the still active water meadows, there are still many remains of former water meadows, where the structure of ditches and trenches has remained relatively intact. However, these areas can only be recognized with the right (historical) background knowledge. The potential of these areas and the technology is therefore often overlooked. That is why we draw attention to the future opportunities of irrigation and water meadows in this brochure.

Image 3: (from left to right): De Maat – De Grote Watering – Het Lankheet © CAG 2023

Vloeiweiden in Vlaanderen & Nederland

Traditional grassland irrigation is an intangible heritage practice that was once used everywhere in Flanders and the Netherlands where water was available. It was known by various names: witteren, (be)wateren, weteren, beëmen ... In the second half of the twentieth century, however, this agricultural practice lost its importance. From then on, many formerly irrigated meadows were treated with artificial fertilizers and heavier machinery. The practice of irrigation disappeared in most places.

In Flanders, water meadows are still active today on the Grote Watering in Lommel and De Maat in Mol, and there are plans to reactivate former water meadows elsewhere in the Limburg Campine region, such as the Lozerheide in Bocholt and the Warande in Hamont-Achel. All of them are lowland meadows with bed constructions. Also in Cierreux, in Wallonia, sloped water meadows have been preserved that are actively irrigated. In the Netherlands, there is still active irrigation in the Lankheet estate in Haaksbergen and on the water meadows in the Pelterheggen in Bergeijk.

Want to read more about the history of grassland irrigation?

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- **Baaijens, G. J., Brinckmann, E., Dauvellier, P., van der Molen, P.C.,** Stromend landschap: vloeiweidenstelsels in Nederland, Zeist, 2011.
- **Van Driessche, T.,** 'Traditionele graslandbevloeiing in Vlaanderen', Onderzoeksrapporten Agentschap Onroerend Erfgoed, nr. 200, Brussel, 2021.
- **Mertens, A. en Simons, L.,** De Vloeiweiden te Lommel-Kolonie, Stichting Limburgs Landschap, 1984.
- **Burny, J.,** Bijdrage tot de historische ecologie van de Limburgse Kempen, Maastricht, 1999.
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- **Or watch one of the videos about the water meadows in Lommel, Mol, Haaksbergen, Cierreux**

Image 4: Every year, at the beginning of March, volunteers practice 'witteren' in Lommel. © CAG 2023

Grassland irrigation in Flanders and the Netherlands

Grassland irrigation was originally an agricultural practice. Initially, it was farmers who designed and constructed water meadows. Later, in the 19th century, governments also saw the potential in these 'farmer systems' and began constructing new, advanced water meadows with a bed construction to enable the exploitation of wasteland, as was the case in the poor soils of the Campine heathlands.

Where the practice used to be the work of farmers, today it is a technique that – at least in Belgium and the Netherlands – is practiced and kept alive by heritage communities. These groups often consist exclusively of volunteers, whether they have a background in nature management and conservation or not.

However, this does not mean that the former agricultural function of the water meadows is forgotten. In addition to irrigating the meadows, the volunteers are also responsible for mowing and haying the grasslands. All the preparatory work and, in some cases, post-grazing by sheep are also part of the irrigators' annual work. For the Water & Land project we worked together with grassland irrigators from Lommel (BE), Mol (BE) and Haaksbergen (NL); all three are heritage communities with a few dozen volunteers. In both Flanders and the Netherlands, this intangible heritage practice has been added to the Inventory of Intangible Cultural Heritage. There is a good connection between these local communities and knowledge and experiences are shared. Moreover, this is not only the case for irrigators in Flanders and the Netherlands, as an international network is currently campaigning for the recognition of the craft on the Representative List of the Intangible Cultural Heritage of Humanity of UNESCO.

Grassland irrigators in Flanders

In Flanders, in 2023, there are only two areas where irrigation is actively taking place: De Grote Watering in Lommel and De Maat in Mol. In Lommel grassland irrigation was restarted in 1979 by a group of volunteers, in collaboration with what is now Natuurpunt Lommel. These volunteers are supported in safeguarding the practice by Erfgoed Lommel. The heritage community of De Maat in Mol has many similarities to the one in Lommel. Here too, volunteers carried out the necessary

repairs to make irrigation possible again, in this case in 2020 with the support of Natuurpunt Netebronnen. Visitors and hikers today can once again discover more than 170 years of irrigation history in Lommel and Mol.

Grassland irrigators in the Netherlands

As in Flanders, the Netherlands has two other important areas where grassland irrigation is practiced: the Pelterheggen in Bergeijk and the Lankheet in Haaksbergen. In the Water & Land project, there was active collaboration between all players of the heritage community when volunteers restored the flood meadows in the Lankheet in 1999, and again they have combined their efforts in the Stichting Waterpark, where the focus is on combatting drought, restoring nature, and storing water through the management of flood meadows.

Image 5: An international network of grassland irrigators and representatives is committed to traditional irrigation on a European scale. © Weitblick Film

International community

Grassland irrigation is not only practiced in Flanders and the Netherlands, flood meadows can also be found elsewhere in Europe.

At the instigation of researcher and driving force Christian Leibundgut, an international network was established around traditional irrigation. For several years, representatives from Belgium, the Netherlands, Switzerland, Austria, Germany, Luxembourg and Italy have been meeting to share expertise, research, and experiences regarding traditional irrigation.

Together they prepared the multinational dossier on “Traditional Irrigation: technique, knowledge and organisation” to be included on the Representative List of the Intangible Cultural Heritage of Humanity of UNESCO, succeeding in that goal in December 2023.

Want to know more about the international trajectory?

Take a look at the website of the Internationalen Zentrums der Traditionellen Bewässerung in Europa (IZTB).

Image 6: About fifteen volunteers provide irrigation in Lommel every year © Willem Tel 2023

Sustainable flood meadows

Traditionally irrigated meadows can be sustainable and climate-robust in various ways. For example, these water meadows are always areas of species-rich grassland. Dozens or even hundreds of native plant species can be discovered there. Moreover, these grasslands not only contain local species, but there are also species that travel with the water, or those that are more likely to be expected in more calcareous environments. And not only is the growth of these species promoted by the irrigation, the grass itself also grows earlier, which provides an extra cut and therefore a greater hay yield possible. However, the use of grasslands has decreased significantly in recent decades, hay production has become less important, and species-rich grassland has become rare.

The restoration of these old infrastructures therefore not only yields in terms of water management, but also for the restoration of (species-rich) grasslands in the context of climate mitigation and adaptation, for example via the Flemish Nature Conservation Decree. Moreover, the water meadows are also examples of permanent grasslands, and in that form they are also of important value in the fight against climate change. Because there is no tillage done on these grasslands, they keep a richer soil life, and they retain water much better.

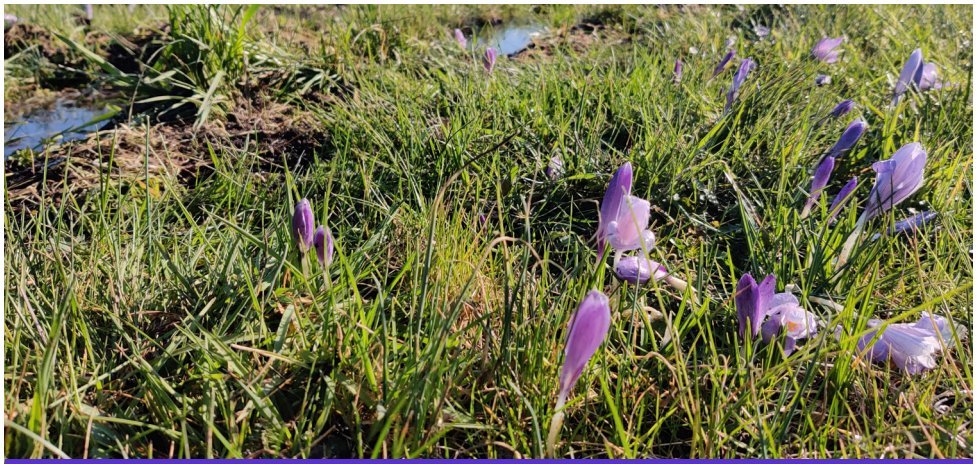


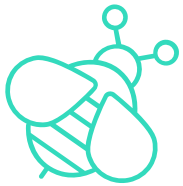
Image 7 : The spring crocus is one of many species to be found in the flood meadows of Lommel © CAG 2023

Biodiversity is key!

De Grote Watering in Lommel shows a high diversity of species. In the water meadows and their immediate surroundings, 277 species of plant were recorded over the period of 2000-2020! Meanwhile, in, the water meadows along the Kempen canals, 484 plant species in total were discovered. Moreover, they do not only contain local species, with more than 40 species having been found that belong to Alpine meadows, Haspengouw, and South Belgium. Such examples include the golden primrose and autumn crocus, meaning that such grasslands have an exceptional scientific value.

Would you like to read more about the diversity of the floodplains in Northern Limburg?

You can read more about this wealth of biodiversity in the flow meadows in the publication De wateringen in Noord-Limburg (Berten, R. and Jansen, A., Genk, 2021).



These effects in biodiversity have a deeper cause, bearing in mind that biodiversity on the surface is related to what is in the soil. The healthier soil life is, the more organic matter is converted. This means that more can then be extracted from the soil for plant life. This is another indication in how water meadows can be seen as sustainable. Grassland irrigation ensures that the phosphate, nitrogen, potassium, calcium and humus content of the soil is high, making it ideal for soil life and fertility. In addition, years of irrigation forms a sludge layer that is 10 to 20 cm thick in some places. This sludge layer reduces symptoms of drying out in the soil and ensures better water storage. In addition, the water flowing over irrigated grasslands is given time to infiltrate into the soil, a property that is often lacking in urbanised and agricultural areas today.

Grassland irrigation can be very valuable in terms of rewetting the environment and raising the groundwater level. And that is precisely one of the increasingly recurring challenges in today's climate. The water that flows over irrigated grasslands is given time to infiltrate into the soil. In the fight against drought, grassland irrigation is a method that can be applied not only in the large stream valleys and in former floodplains, but also beyond, for example along river floodplains.

> *A piece of agricultural land can be irrigated for 1000 years without the soil becoming impoverished. Nature provides minerals, the plants absorb them. It is a circle that continues continuously. If the word sustainability has any meaning anywhere, it is here.*
>
> — Albert Jansen, co-curator of the Grote Watering in Lommel

Grassland irrigation can be compared to the restoration of wetlands such as swamp areas or wet woods. We can store an enormous amount of water in our soil, it simply needs to be given time to infiltrate.

— Hans Nuyttens, watercourse manager

The system of the water meadows allows water, which now falls much more often in peak periods, to be retained very effectively. The infrastructure of the irrigation can therefore not only be useful in rewetting, but can also be used for water storage. In the Lankheet in the Netherlands, where the water meadows are used as a buffer during peak discharges, a 'model' of cooperation already exists with the local Water Board.

Additionally, the wet environments of the water meadows are extremely suitable for carbon storage: they retain a great deal of CO2. Finally, practical knowledge about guiding water through ditches and streams, and the associated maintenance of these watercourses, can provide great inspiration.

It is essential that the European Water Framework Directive intervenes in landscape matters over the coming years. Using water meadows for rewetting and water storage may well correspond with some of the objectives of this directive, the aim of which is to manage groundwater and surface water as well as possible, and to improve water quality. Water is regarded as a heritage, one which therefore must be treated, protected and defended. Measures to protect these water supplies on the surface and in the ground can therefore lead to the rewetting of the environment, meaning that grassland irrigation can play an active role in this process.

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.

The fact that there are so many ditches here, 240 km, where rainwater is collected and given time to penetrate the soil, all contributes to waterlogging.

— Jan Leroy, guide for Natuurpunt Lommel

Inspiring examples

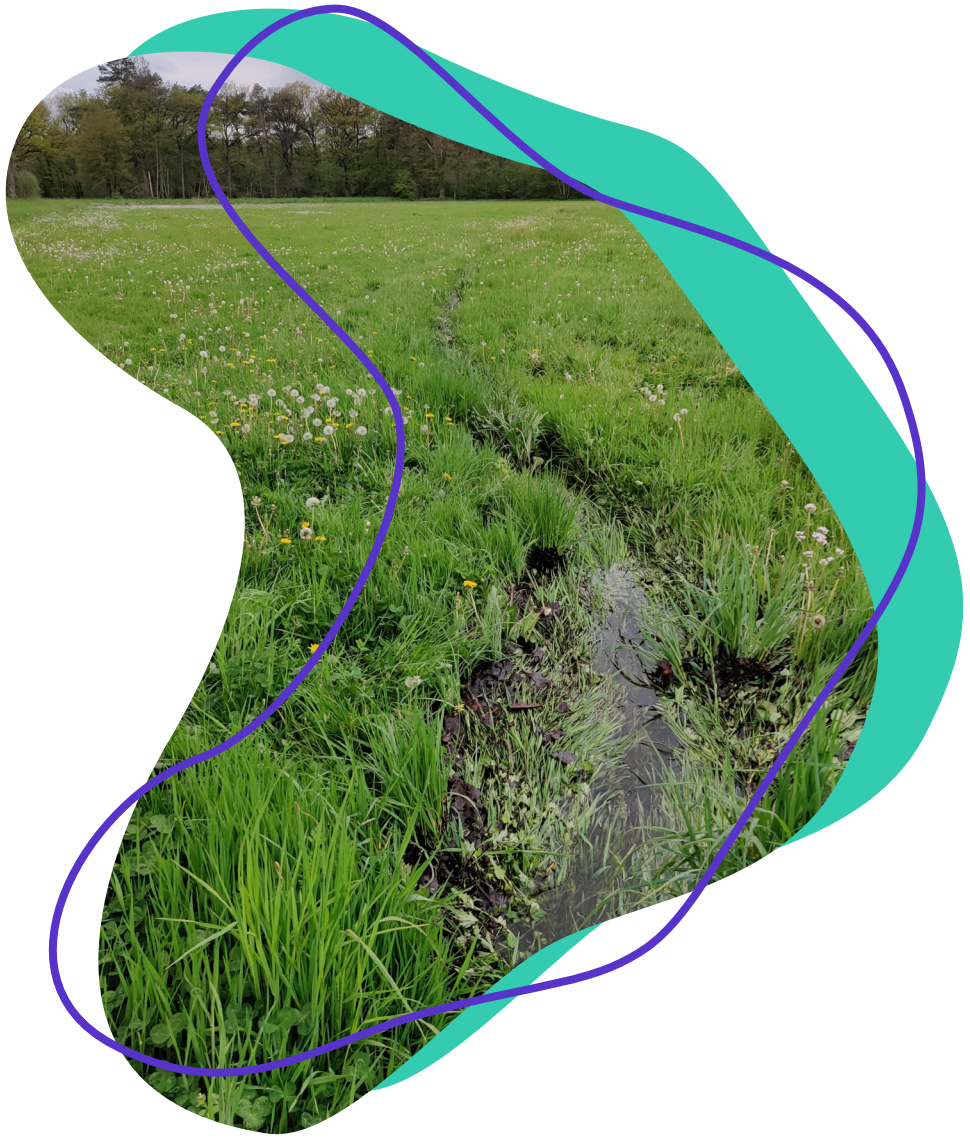


Image 8: Lankheet (c) CAG 2023

Sensory Landscape: eDNA measurements in the Lankheet

Understanding the soil is crucial for maintaining and managing floodplains. What exactly happens in the soil of irrigated grasslands? In the Sensory Landscape project – a research project initiated by Overijssels Particulier Grondbezit and Landgoed het Lankheet – soil moisture sensors and environmental DNA analyses are used to measure not only the chemical composition and organic matter content of the soil, but also soil life and soil biology. The project is designed to map out several ecosystem services such as biodiversity, greenhouse gas emissions and water regulation at plot level. The flood meadows in the Lankheet are one of the many Dutch test plots being used in the project, and amongst the total of 130 is a diverse range of types, from plots with intensive to extensive agricultural use, nature-inclusive plots, and moist and dry grasslands, etc.

The first results of the research confirmed what many irrigators had already believed for some time, that water meadows retain moisture for a very long time, even during dry periods. In addition, the vitality of the soil itself increases. For example, there is a large presence of nitrogen-consuming bacterial communities, which bring about increased biodiversity above ground. The irrigated meadows also perform well in terms of carbon storage, and thus make a substantial contribution to today's climate challenges.

Image 9: Meadow on the border between irrigated and non-irrigated areas, in August 2022. It is clear how far the impact of irrigation reaches... © Eric Brinckmann

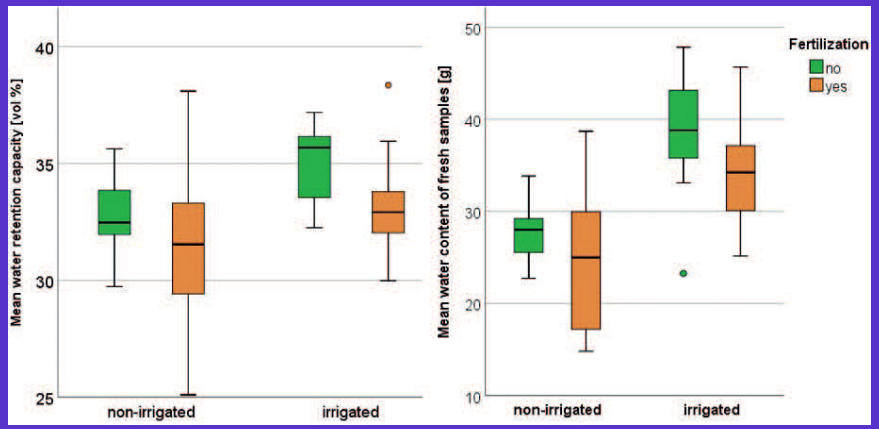
In 2023, the research was expanded with a number of measuring points in the floodplains of Lommel and Mol. The measurements collected substantiate previous findings on the positive effects that grassland irrigation seems to have on the soil. This allows well-founded statements to be made about the climate-adaptive (e.g. water storage and the strengthening of soil ecology) and climate-mitigating (e.g. carbon storage and increased biodiversity) properties of the flood meadow landscape. Ultimately, the Sensory Landscape project should be able to provide an instrument which has the capacity to establish which services farmers or soil managers additionally provide for the improvement of the soil, so that compensation for this can be made possible in the future.

Meer weten over het project Sensorisch Landschap?

Want to know more about the Sensory Landscape project? You can do so via projectwebsite van Soil4U, or by watching the Lankheet film on the projectwebsite Water & Land.

Water retention in water meadows

In Germany, research has been conducted into the water storage capacity of water meadows. It was found that irrigated meadows retain water better than non-irrigated meadows, and that fertilisation has a negative impact on this. This is partly due to the fact that fertilisation affects active soil life.



Read the full study

Buhk, C., Schirmel, J., Rebekka, G., & Frör, O., 'Traditional Water Meadows: A Sustainable Management Type for the Future?' IntechOpen. (2019). doi: 10.5772/intechopen.79429

Restart in Mol

Reviving former water meadows is not easy, but certainly not impossible. In 2022, the first water meadows were restored in De Maat in Mol (BE), a fine example of how historical water systems can be re-used and, if necessary, be used for a different purpose.

The watering areas in Mol consist of a few numbered plots. On the plot named 'Watering 3', restoration work began in 2020. This involved removing tree stumps from the floodplain, filling holes in the bed structure, and placing weirs, among other activities. In February 2022, irrigation was once again possible in De Maat for the first time in forty years. The plot named 'Watering 1' is currently still in full recovery. Rough works have been carried out, such as logging and mowing down blackberry growth, and this will be followed by work on the newly installed weirs, which must be checked per irrigation ditch.

The water meadows in Mol are part of the same nineteenth century reclamation project which also includes the nearby meadows of Lommel. Volunteers from Mol were able to join the community in Lommel for inspiration and support, as well as to learn about intangible heritage, how to maintain the irrigation infrastructure, and irrigation beds, along with the ecological benefits of irrigation.

The project in Mol is a collaboration between volunteers, Natuurpunt Netebronnen, and the municipality of Mol. Its purpose is to restore the historical waterways, but also, and more significantly, to see what can be achieved in the future in terms of biodiversity, and how certain rare species can be preserved or given an extra boost by irrigation. From a touristic point of view, it is also interesting to be able to show visitors and hikers how landscape management was done in De Maat in the past, from irrigation, to haymaking and mowing.

Image10: restoration works in Mol on Watering 1 © Willem Tel

Want to know more about the restart of irrigation in Mol?

Watch the video on www.waterenland.be or read more here!

Image 11 : Aerial view of Watering 3 in Mol. The 'spots' in the landscape still show where trees had grown across the bed structure of the water meadows

Opportunities and challenges

Today, we face many challenges in the areas of sustainability and climate, spatial planning, and social issues. With the 'Water & Land' project, we are convinced that intangible heritage can make a huge contribution to the necessary climate transition. Intangible heritage practices, such as traditional grassland irrigation, have always adapted to the ecosystems and environment in which they function. The management of water meadows 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,' whilst also shaping 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 in floodplains

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.

Many ecosystem services can be linked to irrigated grasslands. These include not only cultural services, but also - and perhaps even more - regulating services.

Image 12 : water meadows can provide many ecosystem services, including producing (blue), regulating (purple), and cultural (green) 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.

and insights from farmers in a contemporary way into your management. We only see possibilities. It requires more attention, but also provides more connection with the soil and the environment. Then you get a lot in return".
A deep connection between man and nature is sometimes referred to as eco-citizenship; an ecological awareness of belonging to

> *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 a focus on a landscape approach is therefore necessary. Intangible heritage, such as the practice of traditional grassland irrigation, can play a role in such a change of mentality, as it contains a wide range of ideas and inspiration. Heritage can connect people and nature in this way. For grassland irrigators themselves, actively working in and with the landscape and the water gives a sense of connection with nature. Eric Brinckmann, who is associated with the water meadows in the Het Lankheet estate, also states: "You can apply old techniques

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

> *working together is necessary. Water issues and the need for farmers to deal with water in a different way, actually match in many cases. Water issues can take the lead, for example in providing ditches with reed filters in which to purify water. It is a matter of thinking smart and working together.*
>
> — Eric Brinckmann, co-curator of the Lankheet estate

It is therefore important to link objectives in the field of nature, heritage and watercourse management. In the Lankheet estate, such a collaboration was achieved between the irrigators and the Rijn en IJssel Water Board. Since 2015, the water meadows of Lankheet can be used for water storage during peak discharges. Approximately 200,000 m^3 of water can now be stored! Eric Brinckmann sees it as a win-win situation: "We can continue with water meadow systems here that make the landscape more climate-robust, but at the same time we have interwoven them with functions that are important to the Water Board."

In such collaborations, sufficient attention on how the plan could be of added value for all parties is essential. Arjan Conijn, postdoctoral researcher 'Living dikes' at the University of Groningen and expert in 'landscape, water and heritage' at consultancy and engineering firm WitteveenBos , also emphasizes 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."

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.

Equally important is that co-production of knowledge becomes possible. Heritage communities can thus share their knowledge and feel involved in sustainable, future-oriented area development. At the same time, policy-makers can also share their views, thereby giving heritage an active role. Again, it is the volunteers in Lankheet who are already actively pursuing this line of thought, according to Eric Brinckmann: "Drawing up a water plan for a larger area requires cooperation. But with such a plan you can indeed learn a lot from the past. Breaking the taboo of that individualism is necessary."

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 research in Lankheet and the restart in Mol, and 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. Moreover, it is not only in Flanders and the Netherlands that inspiring examples can be found. In the summer of 2023, several newspapers reported on the system of the acequias Moorish canals in the south of Spain that have existed for hundreds of years and which are used to moisten dry soils for irrigation. The acequias had disappeared throughout some Andalusian villages, but since 2014 a team of volunteers have dedicated themselves to the restoration of these old structures.

Another example we should consider in connection with grassland irrigation is the Sigma Plan, a project created by the Flemish government to reduce flood risks along the river Scheldt. As part of the Sigma Plan, historical meadows (along the floodplains of rivers) and hayfields would be restored along the river Durme, but also controlled flood areas would

be created along the Scheldt, a practice which was inspired by the principle of irrigation. Previously, behind the winter and summer dikes were water meadows. Here, small sluices in the winter dikes made it possible to irrigate the grasslands behind the dike, and remnants of this can still be found here and there. The system fell into disrepair due to the deterioration of the water quality, but it is now a source of inspiration for the controlled tidal area. Sluices were once again installed in the dikes, and the age-old practice of grassland irrigation formed the basis for creating a flood area that can create a buffer, as well as being ecologically important and able to evolve into salt marshes.

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

Image 13 : Flood area the Scheldebroeken © Yves Adams

Tijdens het eerste projectjaar 'Waterbeheer' werd al een start gemaakt om beleidsinstrumenten te toetsen aan de hand van dat kader. De vijf elementen van het Biocultural Heritage Framework zijn allemaal in meer of mindere mate aanwezig in Vlaams, Belgisch, Nederlands en Europees beleid. De komende jaren zet het project verder in op het bekijken van visie- en beleidsteksten door de bril van dit kader, op zoek naar kapstokken om erfgoed aan op te hangen. Aan het einde van het project delen we deze resultaten.

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. Or as Albert Jansen, co-curator of the Watering in Lommel, put it: "You can only understand what grassland irrigation means when you actually see it happening and the consequences become visible. That is also one of the reasons why it disappeared from the collective memory so quickly". It is therefore crucial to involve heritage communities in the research, but unfortunately this historical knowledge is not always taken seriously. Moreover, it is not only about the biological and ecological influence that heritage has (had), but also about the identity formation and social aspects associated with 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 further catalogue former water meadows, to investigate where there are opportunities to reintroduce the technique, or what opportunities the existing structures offer per location to respond to climate challenges. With the help of the Digital Height Model and LIDAR images, for example, the nineteenth-century water meadows in bed construction in the Campine region (Kempen) are often clearly recognizable. However, other water meadow systems have also left traces in the landscape. For example, the presence of reed and ivy reveal hydrologically interesting locations, with upwelling or superficial runoff water.

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 watered, historical research into the agricultural past in wet areas can provide information about varieties and species that thrive there. Historical research can help understand why certain solutions such as 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.

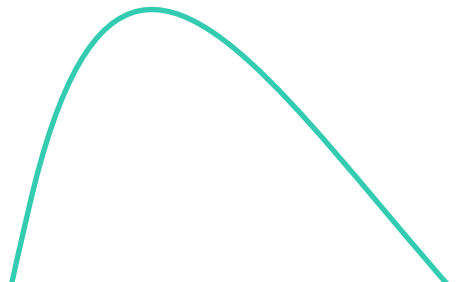


Image 14 : The flowing water deposits all kinds of minerals and nutrients on the water meadows © Willem Tel 2023

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 water meadows as relics of the past. But by seeing these grasslands in their landscape and understanding their social and economic significance, new possibilities are feasible. The water meadows can be crucial in climate adaptation, rewetting and other water tasks, such as water storage.

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 15 : Practicing traditional irrigation brings volunteers closer to each other and to nature © Willem Tel 2023

Read more

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Interesting links

Centrum Agrarische Geschiedenis, themaverhaal 'Witteren: rijke waters, golvend gras...'

Erfgoed Deal Nederland, website Erfgoed Deal

Ons Water in Nederland, 'Wie doet wat?'

Rijksinstituut voor Volksgezondheid en Milieu, Kaderrichtlijn Water (KRW)

Rijksoverheid, 'Waterbeheer in Nederland'

Soil4U, 'Sensorisch Landschap'

Vlaamse Milieumaatschappij, Europese Kaderrichtlijn Water

Vlaamse Milieumaatschappij, Vismigratie

Water meadows (active and in recovery) in Flanders & the Netherlands:

- Grote Watering te Lommel
- De Maat in Mol
- Lozerheide te Bocholt
- de Warande te Hamont-Achel.
- Cierreux, in Wallonië
- het Lankheet in Haaksbergen
- Pelterheggen te Bergeijk.

Project Water & Land

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.

Watch

Listen

Read

CAG and KIEN dedicate this brochure to Albert Jansen (1956 – 2023), co-curator of the Grote Watering in Lommel. With unbridled enthusiasm he committed himself to the recognition and safeguarding of the technology on the Inventory for Intangible Cultural Heritage in Flanders. An enthusiasm that did not stop at the national border: he was one of the initiators in the international network that led to the addition to the Representative List by UNESCO. His valuable input and knowledge about traditional grassland irrigation were indispensable in the Water & Land project and in this brochure.

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