



Ville Forests Forests- waterworlds

After-LIFE Conservation Plan

Landesbetrieb Wald und Holz
Nordrhein-Westfalen





The core objective of the LIFE+ project „Villevälder – Forests-Waterworlds” was the protection and promotion of the rare and highly endangered oak-hornbeam forests on hydromorphic soils and its inhabitants. Further goals were the promotion of amphibians by restoring forest waters and the restitution of species-rich forest meadows.

The After-LIFE Conservation Plan describes the situation after the project’s official closure and presents a plan of action to safeguard and further develop the project’s objectives and measures.

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Project objectives and results

„Ville Forests - Forests-Waterworlds“ was implemented from 2014 to 2020 by the Regional Forestry Office Rhine-Sieg-Erft and the Biological Station Bonn/Rhine-Erft e.V. to protect the oak-hornbeam forests in the Kottenforst and Ville area. The project was financed in equal parts by the European Union and the Ministry of the Environment of North Rhine-Westphalia.

The Ville forests between Cologne and Bonn contain one of the most extensive coherent occurrences of oak-hornbeam forests on hydromorphic soils (Code 9160) in Western Germany. The forest area is notable for its high proportion of old forest stands with oaks up to 250 years old. It provides habitats for woodpecker and bat species protected throughout Europe, such as the middle spotted woodpecker (*Dendrocopos medius*) and the Bechstein's bat (*Myotis bechsteinii*). The project area includes the four Natura 2000 sites „Waldreservat Kottenforst“ (DE-5308-303), „Waldville“ (DE-5207-301), „Villevälder bei Bornheim“ (DE-5207-304) and „Altwald Ville“ (DE-5207-303) with a total area of 4,378 hectares.

For centuries, human use has shaped the Ville forests. This human interference has negatively affected the conservation status of natural forest habitats and the forest-dwelling species' living conditions.

Thus, a network of old drainage ditches cuts through the forest area, threatening the oak-hornbeam forests' existence. Therefore, drainage ditches were selectively closed in an area of 533 hectares to restore the natural hydrological balance of these soils. This measure also mitigates the effects of climate change with its drought periods. Surface runoff in spring and after heavy rainfall events in the summer is reduced, thus improving the water supply in dry periods.

Before starting the project, one-fourth of the Natura 2000 surface area was still stocked with pure stands of non-native conifers. Forest conversion was initiated on an area of 234 hectares through succession-supported development to expand and connect the existing natural forest habitats. For this purpose, characteristic tree species for the habitats such as oak, hornbeam, small-leaved lime, and European beech were planted in groups or loose rows. Numerous other tree species emerged by natural regeneration so that mixed oak forests with highly diverse forest structure and species composition will develop in the long term.



Old trees and deadwood are vital structures for safeguarding the biodiversity of the Ville forests. Managed oak-hornbeam forests often lack corresponding structures due to forestry use. Therefore, the LIFE+ project developed and implemented a habitat tree

concept to ensure a sufficient supply of old trees and deadwood in the natural forest habitats. In the process, at least ten habitat trees per hectare were taken out of use in the commercial forests and protected against accidental logging through marking them with a badge. Preference was given to securing standing dead trees, trees with cavities and eyries, and old trees with ecologically valuable microhabitats.

Open forest structures support the biodiversity of our forests. In the LIFE+ project, they were established on 40 hectares by resuming traditional coppice with standards forest management. Insect species requiring light and warmth benefit from this, as do the project's target species.



from the intensely used conurbation. By sowing and planting grassland species typical of the habitat, the project was able to preserve and newly establish species-rich lowland hay meadows with false oat-grass (Code 6510), *Nardus* grasslands (Code 6230) and purple moor-grass meadows (Code 6410).

The Ville forests are among the most significant habitat areas for amphibians in North Rhine-Westphalia. Agile frog (*Rana dalmatina*), a protected species throughout Europe, great crested newt (*Triturus cristatus*) and midwife toad (*Alytes obstetricans*) can be found here. Eighty-one forest water ecosystems have been newly established or were restored so that the habitat area for the target species expanded significantly and sub-populations have in part already become interconnected. Additional measures for strengthening the population's size prevented the extinction of the last occurrence of midwife toad in the Ville forests. The floating water-plantain (*Luronium natans*) has also returned to a restored water body.

Forest meadows in the Ville forests are refuges for open land habitat types that have largely disappeared

The Natura 2000 areas of the Ville serve as local recreation areas for the neighbouring large cities and are frequented intensively. To ensure acceptance of the project measures, a wide range of public relations work complemented the project. Altogether, there were 145 events including lectures, guided forest tours, information booths, seminars and training events for the interested public and experts. All generations were able to participate in forest-related education activities and volunteer opportunities actively. In this process, the project also provided information on the importance of the Natura 2000 system of protected areas for safeguarding biodiversity in Europe. The survey conducted at the end of the project revealed the high acceptance of forest visitors for the measures of this LIFE+ nature conservation project.

Responsibilities and actors

The project was implemented jointly by the Landesbetrieb Wald und Holz North Rhine-Westphalia, represented by the Regional Forestry Office Rhine-Sieg-Erft (RFA-RSE, coordinating grant beneficiary), as the lead partner and the Biological Station Bonn / Rhine-Erft e.V. (BioStatBN, associated grant beneficiary). The state of North Rhine-Westphalia owns all areas for implementing measures. The regional forestry office administers and manages them in the public interest. Thus, permanent access to the sites is ensured. The Biological Station Bonn / Rhine-Erft is in charge of the

nature reserves in the municipal area of Bonn (Natura 2000 site „Waldreservat Kottenforst“) and the Rhine-Erft district (Natura 2000 sites „Villevalder bei Bornheim“ in part and „Altwald Ville“) on behalf of the Ministry of the Environment of North Rhine-Westphalia. The station cooperates closely with the Biological Stations of the neighbouring districts (Biological Station Rhine-Sieg district e.V.- Natura 2000 site „Waldville“ and „Villevalder bei Bornheim“ p.p.; Biological Station Euskirchen e. V. - Natura 2000 site „Villevalder bei Bornheim“ in part).

Swot-Analyse

Strength

- The project combines silvicultural and nature conservation expertise through cooperation between forestry and nature conservation institutions
- It founded a trusting and interdisciplinary cooperation between the project partners..
- Close stakeholder involvement in the working group complementing the project has led to a high level of acceptance for the project's objectives.
- The locally responsible Regional Forest Office Rhine-Sieg-Erft (RFA) has direct access to the areas under measures. These are managed and further developed by their own staff.
- The level of acceptance for the project's objectives and measures within the RFA is very high.
- A broad specialist basis with respect to nature conservation has been established through many up-to-date inventories as well as through the bundling of existing information (woodpecker and bat mappings, database wood habitat, soil maps, forest management).
- There is a dense network of monitoring plots, including reference plots with up-to-date data.
- Many communication tools are available
- A coordinated habitat tree concept is in place
- The project partners possess significant practical experience in the implementation and optimization of the project measures.

Weakness

- After completion, the project no longer has personnel and financial resources in the RFA and the Biological Station Bonn / Rhine-Erft

Opportunities

- Public interest in the topic of forests and their protection has increased. Pressure on politicians to promote forest conservation measures is increasing.
- The public and politicians more strongly perceive the importance of the ecosystem services of our forests.
- Extended bark beetle calamities in spruce forests due to the drought years from 2018 to 2020 have sparked increasing interest in forest conversion to develop mixed forests rich in forest structure and species composition.
- Oak continues to gain importance as a climate-adapted native tree species.
- The city of Bonn has gained a reputation as an international location for sustainable development. Many national and international players have offices here.
- Nationwide, the Ville forests have gained recognition as an example for integrative forest management, not least owing to the project.
- There is a strong interest among private and public forest enterprises as well as voluntary and institutional nature conservation actors in the experience gained from implementing Natura 2000-compliant forest management.

Threats

- Climate change is altering site conditions.
- Excessive game densities could threaten succession-based development.
- An increase in timber demand may lead to increased exploitation pressure on hardwoods and may increase the cultivation of fast-growing tree species not typically found in those habitats.
- The spread or stimulation of pests and invasive species due to climate change and globalization threatens the target tree species of the habitat types (e.g., calamities caused by the oak buprestid beetle) and the target species of the Natura 2000 sites (e. g., amphibian chytrid fungus disease)



The plan

The LIFE+ project „Ville forests“ is an example of a successful partnership between forestry and nature conservation. The Regional Forestry Office Rhine-Sieg-Erft and the Biological Station Bonn / Rhine-Erft e.V. will continue their trusting and constructive cooperation after the project in order to secure and further develop the project's objectives and measures. For this purpose, a working group (WG) will be established with representatives of the Forestry Office (department of state forestry - FGL) and the Biological Stations in the project area (Biological Station Bonn / Rhine-Erft, BS Rhine-Sieg and BS Euskirchen). It will meet once a year at the invitation of the Forestry Office. The WG coordinates the implementation of the measures defined in the After-Life Conservation Plan. For this purpose, site inspections are carried out, and the monitoring results will be presented and discussed. Furthermore, the group examines the possibilities for follow-up projects.

The After-LIFE Conservation Plan describes the necessary measures for each project objective and specifies responsibilities and financing. It describes the implementation period and distinguishes between the necessary measures in the After-LIFE period (5 years) and permanent or long-term measures beyond that.

Checklists will be used for the documentation of the inspections and the implementation of the measures. These will be maintained by locally responsible forestry officials and employees of the Biological Station, who forward them annually to the head of the department or the management

Abbreviations:

RFA - Regional Forestry Office Rhine-Sieg-Erft

BS_BN - Biological Station Bonn / Rhine-Erft e. V.

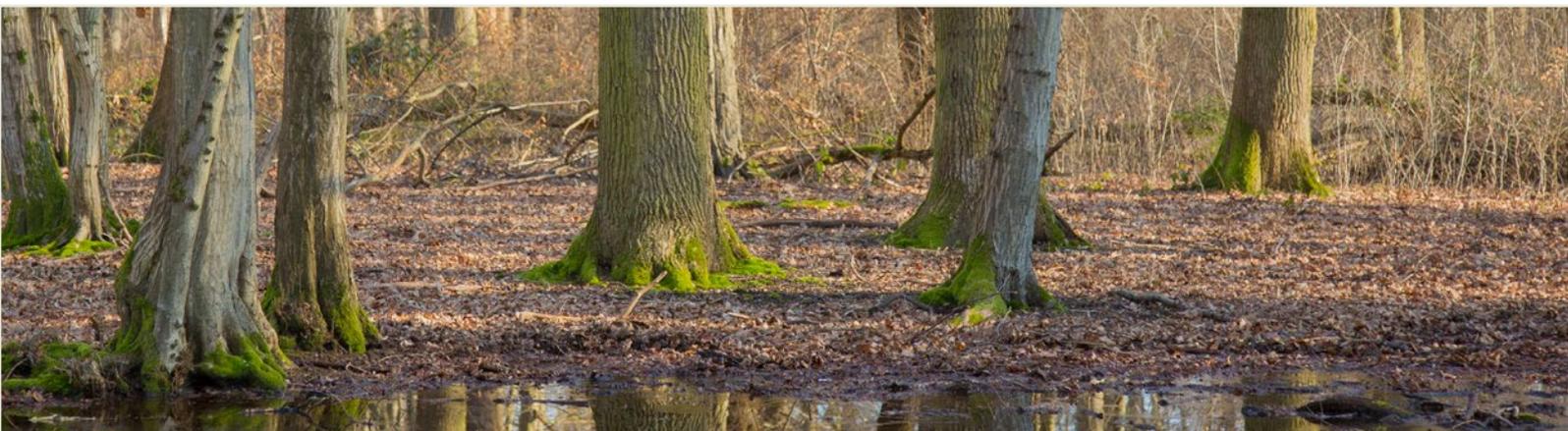
BS - Biological Station in charge

FBB - Implementation by the forest district officer in charge

external - implementation through external experts

LANUV - State Office for Nature, Environment and Consumer Protection of North Rhine-Westphalia

MULNV - Financing by the Ministry of the Environment of North Rhine-Westphalia, among other things within the framework of the accounting units (VE) of the biological stations (FÖBS - Funding Rules for Biological Stations NRW)



Restoration of the natural soil water regime of oak-hornbeam forests

In four activity zones inside the Natura 2000 area „Kottenforst“, 345 clay and wood dams were placed to close drainage ditches over a length of 55 km. There is a risk that the dams will be washed out due to regular flooding and thus lose their functionality. Wild boar can destroy shallow barrages. Also, fine-tuning of the measure may be necessary if long-lasting local flooding of the forest floor occurs that threatens the forest stand or the forest roads' stability. The dams will be monitored annually during the After-LIFE period to safeguard and fine-tune the measure. Hydrological and vegetation monitoring will be continued to verify the success of the measure.

Measure	Time period	Responsibility	Financing
Inspection of ditch obstructions at annual intervals	2021-2025	RFA / FBB	Budget RFA
Measuring soil moisture at 29 sampling points on 1 st of April and 1 st of September	2021-2025	RFA / FBB	Budget RFA
Repeat survey of forest vegetation on 29 permanent plots in summer 2024	2021-2025	RFA / FBB	Budget RFA
Annual documentation of results by Dec. 31 st	2021-2025	RFA / FBB	Budget RFA
Inspection of ditch obstructions in the course of regular forest management	permanently	RFA / FBB	Budget RFA



Succession-based development of oak-hornbeam forests and beech forests

A total of 223 planting areas received 350,000 oaks, hornbeams, small-leaved limes, and European beeches to develop natural forest habitats. Loss of the planted target tree species due to drought or game browsing cannot be ruled out in principle. Competing understorey vegetation or emerging secondary tree species could crowd out the target tree species. In the first years after planting, the maintenance measures serve to secure and promote the planted target tree species. In the subsequent young growth and young stand phase, intervention is only carried out if the target tree species' development is endangered. Naturally emerging secondary tree species are preserved as far as possible. In the thinning phase, prospective elite trees are selected and supported, emphasising the target tree species, especially oak. The development objective in terms of silviculture and nature conservation is establishing mixed oak forests of habitat type 9160, rich in forest structure and species composition, or beech forests of habitat type 9110. Logging takes the form of selection cutting based on exploitable size, felling individual trees or groups of trees and implementing forest tending measures throughout the entire area of the stand. The stocking level is not reduced below 0.5. From the age of 100 years, at least ten habitat trees per hectare are retained. Natural regeneration of the target tree species for the respective habitat types is encouraged. The proportion of tree species not native to the habitat type must not exceed 20 %.

Measure	Time period	Responsibility	Financing
Inspection of plantings at annual intervals	2021-2025	RFA / FBB	Budget RFA
If necessary, tending against competing understorey vegetation	2021-2025	RFA / FBB	Budget RFA
Replacement of losses in the planting areas, where necessary	2021-2025	RFA / FBB	Budget RFA
Annual documentation of results by Dec. 31 st	2021-2025	RFA / FBB	Budget RFA
Establishment of mixed oak forests of habitat type 9160, rich in forest structure, age differences, and species variety, or beech forests of habitat types 9110/9130	permanently	RFA / FBB	Budget RFA



Securing habitat trees and deadwood

Forests are dynamic habitats and subject to constant change. The protected habitat trees will also eventually die and decompose in the long term. Older stands will disappear, and other stands will exceed the monitoring threshold (stand age > 100 years). Therefore, a regular update of the habitat tree concept is necessary. A replacement of wood habitat must be ensured to guarantee a long-term continuity in supply of at least ten habitat trees per hectare (so-called habitat tradition). For this purpose, the data were transferred to the habitat tree database „Xylobius“ of the Landesbetrieb Wald und Holz North Rhine-Westphalia at the end of the project. As part of forest „management, the locally responsible forestry operation officials designate new habitat trees and delete lost specimens from the database.

Measure	Time period	Responsibility	Financing
Adoption of the habitat tree concept into the management plans of the Natura 2000 areas	2021-2025	RFA / FBB	Budget RFA
Annual documentation of those habitat trees that were removed in the course of road maintenance or forestry management (based on tree number)	2021-2025	RFA / FBB	Budget RFA
Conducting an inventory sampling to monitor habitat tree densities in the project area (sample of 2000 trees on a total of 200 hectares, see Action D4)	2030	RFA / extern	Budget RFA
Ongoing protection of habitat trees in the course of forest management	permanently	RFA / FBB	Budget RFA



Coppice with standards forest management in oak-hornbeam forests

As part of the LIFE+ project, coppice with standards-thinning was used in seven forest stands covering an area of 40 hectares. New oaks were planted to secure the upper storey. A loss of the standard candidates due to game browsing or drought or a crowding out by the growing coppice layer cannot be ruled out. To maintain and encourage open forest structures, following traditional coppice with standard procedures and cutting the forest stands in coupes will be essential in the long term. The guiding principle is a typical coppice with standards forest rich in oak (100-200 cubic meters/ha according to MAYER 1992) with a 20-year rotation period of the coppice layer (for details see Final Report “Coppice with standards forest” Action D5). Thereby, an adaptation of the management to today’s economic and ecological conditions is indispensable. These adaptations apply to the utilization and maintenance techniques such as mechanical harvesting of the secondary storey (coppice layer) and establishing a permanent skid trail system. For ensuring the quality of valuable timber in the upper layer, some hornbeam underwood is to be retained for stem protection. It is necessary to secure a sufficient proportion of old trees and deadwood and support rare tree species to boost biodiversity.

Measure	Time period	Responsibility	Financing
Inspection of standard candidates at annual intervals	2021-2025	RFA / FBB	Budget RFA
Tending against competing understorey vegetation, where necessary	2021-2025	RFA / FBB	Budget RFA
If necessary, replanting of standard candidates	2021-2025	RFA / FBB	Budget RFA
Annual documentation of inspections and implemented measures by Dec. 31 st	2021-2025	RFA / FBB	Budget RFA
Resumption of harvesting by coupe-wise removal of the coppice layer and thinning of the upper wood in 20-year intervals	permanently	RFA / FBB	Budget RFA Project funds



Restitution of grassland

The LIFE+ project successfully established species-rich lowland hay meadows with false oat-grass (Code 6510), Nardus grasslands (Code 6230) and purple moor-grass meadows (Code 6410) on 18 forest glades. Annual mowing is required to safeguard these grassland habitat types. It will be carried out by farmers from the region and ensured within contractual nature conservation. If the use is not carried out in compliance with nature conservation requirements, or if it is not carried out at all, the conservation status of the habitat types will deteriorate. Increasing canopy cover from bordering trees can reduce the usable grassland, so that the financial support will lapse. The forest meadows are protected from wild boar by fencing. In case of damage to the fences, there is a risk that wild boars will uproot the meadows. As a consequence, the conservation status would deteriorate, and indicator plants of disturbance would spread.

Measure	Time period	Responsibility	Financing
Checking the agreements under the contractual conservation management programme (VNS) and evaluation of the development	permanently	Responsible BS according to VNS-supervision	MULNV
Annual control that the mowing was done incl. fence and gate inspection by Oct. 1 st	permanently	RFA / FBB	Budget RFA
Fence inspection on an event-driven basis (e.g. after storms, driven hunts)	permanently	RFA / FBB	Budget RFA
Annual documentation of inspections and implemented measures by Dec. 31 st	2021 - 2025	RFA / FBB	Budget RFA
If necessary, clearance / repair / replacement of fences	permanently	RFA / FBB	Budget RFA
Maintenance of access roads based on notifications from the farmers	permanently	RFA / FBB	Budget RFA
Removal of encroaching woody plants to maintain area layout	permanently	RFA / FBB	Budget RFA
Regular prolongation of the VNS in five-year cycles	permanently	Biostation in charge	MULNV
New leasing of the forest meadows under compliance with nature conservation requirements	permanently	RFA	Budget RFA



Creation of water bodies in forests for amphibians

The project created or restored 81 water bodies in the forests to safeguard and support protected species' populations of European importance. These waterbodies include both water ecosystems that have been developed as part of Measure C8 (water body creation for amphibians) and Measure C9 (strengthening of the midwife toad population). There is a risk that these waters will be shaded by overgrowing woody plants or silt up due to the spread of reed species. Where necessary, the following maintenance measures are required:

- Removal of shading woody plants
- Weeding in case of strong growth of reed species
- Maintenance of hedges / covering dirt trails with crown material for water bodies near forest roads
- ESSENTIAL: Maintaining open and sunlit terrestrial habitats along the edges of stepping stone water bodies for the midwife toad by pruning, using a mini-excavator if necessary (see Annex for a list of the water bodies).

Measure	Time Period	Responsibility	Financing
Joint inspection of the water bodies at three-year intervals and determination of necessary maintenance measures	permanently	RFA BS	Budget RFA Budget BS_BN
Documentation of inspections and implemented measures by Dec. 31 st	2021-2025	RFA	Budget RFA
Preservation of the water bodies through maintenance measures (maintenance cycle according to the needs for ensuring the conservation status of the target species great crested newt, agile frog and midwife toad)	permanently	RFA / extern	Budget RFA Projekt funds



Strengthening the midwife toad population

Six water bodies in the Kottenforst received a total of 584 midwife toad larvae. Population breakdown due to drying up of the water ecosystems, pressure from predators or the spreading of amphibian diseases cannot be ruled out. Besides, water bodies for the midwife toad require special maintenance of the surrounding terrestrial habitats. These maintenance measures were already considered and presented in point before.

Measure	Time Period	Responsibility	Financing
Annual monitoring of the midwife toad population and documentation according to the LANUV guidelines	permanently	BS_BN	Budget BS_BN
Annual documentation of inspections and results by Dec. 1 st	2021-2025	BS_BN	Budget BS_BN
Further release of midwife toad larvae to secure the population	permanently	BS_BN	Budget BS_BN Project funds



Continuing public relations work and networking

The public relations work will be continued to secure the project's successes and support the objectives for the protected Natura 2000 sites. For this purpose, both project partners will continue to disseminate the information materials produced by the project, such as leaflets, layman's report, project film and project publication. The website and the digital guide "Wood habitats in oak forests" will be available until 2025. The project partners continue to offer guided tours in the project area, highlighting the accomplishments of the project measures and the importance of the Natura 2000 system of protected areas. The Villewälder app is available to forest visitors during the After-LIFE period. Updating the app to current technical requirements and its provision in the Apple or Google Play stores is carried out under a maintenance contract already signed with the company "The goodevil". Specialist publications on the results of the LIFE+ project will be published in 2021.

Measure	Time period	Responsibility	Financing
Dissemination of information materials and providing guided tours in the project area	2021-2025	RFA BS_BN	Budget RFA Budget BS_BN
Maintenance of app "Villewälder"	2021-2025	RFA / goodevil	
Maintenance of app signage	2021-2025	RFA / FBB	Budget RFA
Maintenance of information boards	permanently	RFA / FBB	Budget RF
Providing the website (without additional content maintenance)	2021-2025	RFA	Budget RFA
Publication of project results	2021	RFA BS_BN	Budget RFA Budget BS_BN



Foto: M. König

Note on the monitoring of ecologically significant species

For some species, LANUV has already carried out monitoring in advance. The monitoring will be continued after the end of the project and will be complemented for additional species. It may be necessary to adapt the monitoring to the recently created new conditions in the area (creation of water bodies - great crested newt / agile frog).

Measure	Time period	Responsibility	Financing
Bechstein's bat	permanently	LANUV	MULNV
Midwife toad	permanently	LANUV	MULNV
Middle spotted woodpecker	permanently	LANUV	MULNV
Great crested newt	permanently	LANUV	MULNV
Agile frog	permanently	LANUV	MULNV

In a nutshell

On **533** hectares we have improved the water supply of the oak-hornbeam forests - for this purpose **55** kilometres of drainage ditches were filled at **345** spots. **315,000** saplings of common and sessile oak, hornbeam, small-leaved lime, European beech and alder were planted, so that new mixed oak forests are now developing on **234** hectares. **12,450** oak, beech, hornbeam and lime trees are now protected as habitat trees. Their exact location and micro-habitats are stored in a database. In managed parts of the forests, they are marked with a sticker. **40** hectares of sunlit coppice with standards forests are available as habitat for light and warmth-loving insects. **18** species-rich and floriferous forest glades covering **12** hectares have been created. **4** meadows received grassland cuttings, **28** seed strips were prepared and **48** plots planted with **20** species. **34** ponds have been restored, and **43** new water bodies were created. **600** larvae of the midwife toad were released. **145** guided forest excursions, lectures, advanced training events as well as maintenance and planting campaigns with **3,200** participants took place. **24** press releases were issued and **90** newspaper articles, radio and TV reports covered the LIFE+ project and the Ville Forests. **970** schoolchildren took part in **20** forest education programs. **14** permanent and **13** temporary information boards at **178** locations provided information on the measures and the exceptional conservation value of the Natura 2000 areas. **3** leaflets, one video, one app and one website were published. **2** times, the LIFE+ Project was awarded as a project of the „UN-Decade on Biodiversity“.

Six Years for the Ville Forests

