Interreg 2007-2013 - Central Europe

Project 1CE052P3 ”Semi-natural grassland as a source of biodiversity improvement” (SALVERE)

Work package 5 Report 1

by

AREC Raumberg-Gumpenstein

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1 Workpackage 2 Communication, knowledge, management and dissemination

All acitvites in Workpackage 2 are managed according to the Central Europe Programm. The information which were required to fullfill the tragtes and outputs for WP2 were delivered at the right time from each project partner (media list, newsletter, ...).

1.1 Work Plan

To reach the goals outlined above, the following work plan, as included in the application form is foreseen and at the time of the compilation of this plan already in the implementation phase. All goals from the first project period were reached.

Month	Title	Qualitative Description	Quantittative description
6	Media list	List of the media which can be involved in the communication of project implementation and results. All partners. Each partner responsible for its geographical area.	1 list
6	Project website	General project description downloads of materials produced	1
6	International workshop	All partners involved. International, in Austria organised by PP2, two days. Invitation of practitioners, policy makers, associated institutions, stakeholders and press.	1 Workshop, 1 Field trip, 1 Proceedings, available via the website
6	Newsletter	Electronically distributed newsletter illustrating the development of the project activities. Six months frequency. All partners involved. English.	1 newsletter every six months (6)
9	Project folder	Folder illustrating the project aims and characteristics, English and all languages of the partners.	1 project folder, also translated
10	Regional workshop 1	All partners involved. National, in Poland, organised by PP8, two days. Invitation of practitioners, policy makers, associated institutions and stakeholders.	1 Workshop, 1 Field trip, 1 Proceedings
35 (during the whole project)	Press releases, articles	Spreading information about the project to media. Collection of the press releases and published articles. All partners involved, each partner responsible for its geographical area.	1 collection for each partner (8)
35 (during the whole project)	Networking	Integration into existing networks. Knowledge exchange. Invitation to the conferences and workshops. Participating in other relevant networks, communication events.	1 list of institutions for each partner (8)

1.2 The international Workshop

The international workshop was held from 26-27 May at the Agricultural Research and Education Centre Raumberg-Gumpenstein. 37 participants, 8 of them as invited speakers (see programme of the workshop on the webpage) discussed the relevance and functionality of High nature value Farmland at international, national and local level as well as the possible exploitation, production and use of diasporas from semi-natural grassland. The current European state of the art in ecological restoration was presented and discussed between external experts and the project members. This exchange of perspectives, experience and future prospects gave essential input to the project partners.
8 invited experts (see programme of the int. Workshop on the webpage) were invited to give their input to the project partners. With the help of the presentations, the excursion and following discussion the project partners got a detailed overview on

1. Relevance and functionality of semi-natural grassland in Europe,
2. the importance of HNVF as future base line indicator for European policy
3. the state of the art and the current problems of collection, harvest and production of diaspores from semi-natural grassland,
4. examples and recommendations for the certivication and use of semi-natural seeds,
5. the status quo and future prospects of ecological restoration of HNVF. With this essential information, all partners got updated state of the art information as a necessary precondition for a successful regional implementation of the main project targets.

1.3 The national Workshop in Poland Poznan

The national workshop was held from 22 - 23 September in Poland Poznan at the Department of Grassland Sciences of Poznan University of Life Sciences (PULS). Sixty experts form different countries and many Institutions attended the Workshop. The workshop was divided into two parts. The first part took place at Palace Wasowo conference hall, it was a series of lectures concerning semi-natural grassland restoration, seed market and seed production of native plants. The second part of the workshop was a field trip combined with mini-sessions in the Natural Education Centre in Psyche, where the workshop participants had the occasion to hear two interesting lectures about nature (including semi-natural grasslands) protection problems, from the practical point of view. 13 invited speakers gave us an overview of

Figure 1: All participants of the regional Workshop in Poland

- Diversity richness in Poland
- Threats and opportunities for polish semi-natural meadows
- Polish market concerning ecological, multi species seed mixtures
- Nature protection problems

The proceedings of the workshop are on the SALVERE Homepage under: http://www.salvereproject.eu/content/workshop-poland

1.4 The project website

The project website is besides the workshops and conferences one of the key components of the communications strategy. Contributions for the website come from all partners, are compiled and prepared for web-use by PP2 and put online. The website is built up in english, but translations to partner languages is planned. A translation in Czech is already available at http://oseva.cz/salvere/index.htm. New material is put online as it gets available and is downloadable for everyone. The proceedings and presentations of the first regional workshop are already online.

1.5 The project folder

Figure 2: Folder in different languages

The project folder was created in 6 different languages: English, German/Austrian, Czech, Slovakian, Polish and Italian. The translation of the folder was done by the responsible project partner and designed by AREC besides the one from Czech Republic they did it by themselves. Every Project Partner is responsible to print it in the own country. The English version was printed by the Work package leader and every Partner got the same amount of flyers via mail. The folders in different languages are on the webpage to download on: http://www.salvereproject.eu/content/downloads.

1.6 Newsletter / Networking / Publications list

The Newsletter was sent out at beginning of December. All articles form the Project Partners were delivered on time. The publications list is in work and all publications will be collected by the Work package leader and it will be delivered next year. The communication within the team is very good and works via mail/phone or we meet each other at the workshop and upcoming events. The newsletter is also available on the project's website at www.salvereproject.eu/content/downloads.

2 Workpackage 3 High Nature Value Farmland (HNVF) in Central Europe

Biodiversity conservation goals in Europe cannot be met only by protecting particular habitats or species, or designating certain areas for their management, such as Nature 2000 sites. Extensively managed semi-natural grasslands are seen to be a very important source of biodiversity and can therefore be part of High Nature Value Farmland (HNVF). HNVF has been nominated as an objective-related baseline indicator according to the EU Common Monitoring and Evaluation Framework for the rural development programmes of the EC. Along with the Farmland Birds Indicator, the HNV indicator is intended to contribute to assessing the impact of programmes on biodiversity. The estimation of HNVF distribution in Europe on the basis of CORINE land cover makes clear that the prevalence is in less productive areas (e.g. mountainous regions, alpine regions).

The first activities concerning WP3 focussed on the status quo of High Nature Value Farmland with a special consideration of the definition of HNVF. There is still agreement on the overall definition given by ANDERSEN et al. (2004): “HNV farmland comprises those areas in Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports, or is associated with, either a high species and habitat diversity or the presence of species of European, and/or national, and/or regional conservation concern, or both”. Beyond this description a detailed definition including reliable indicators to qualify and quantify HNVF is necessary and this is in charge of the different EU-countries. Such a final definition provides the basis of all further aspects.

2.1 Material and methods

During the kick-off meeting, held at AREC Raumberg-Gumpenstein from 13th to 14th of January 2009, the structure of WP 3 and the planned activities were presented (i status quo of HNVF, including the main topic of this report “definition of HNVF”; ii agricultural policy and HNVF; iii future development of HNVF). At the beginning of March 2009 a questionnaire (see annex 1) with at all 11 batteries of questions was generated and arranged with the project leader. On 9th of March 2009 the questionnaires were sent to all participants of SALVERE requesting them to distribute the questionnaires to national stakeholders. The 14th of April 2009 was set as the deadline of returning the filled in questionnaires. Overall 26 questionnaires were sent back (Czech Republic 3, Slovakia 2, Poland 12, Germany 3, Austria 1, Italy 4 and in addition Hungary 1) which can be named a very high return rate.

In addition to the questionnaire the specific Austrian activities and efforts on the definition of HNVF have been considered in detail. In Austria the Federal Environmental Agency, Vienna is responsible for this important indicator including both its exact definition and mapping of HNVF for the total Austrian farmland area.

2.2 Results of Workpackage 3

2.2.1 Analyses of questionnaires

The returned questionnaires were collected and analysed at the AREC Raumberg-Gumpenstein. At first view the results show that in most partner countries very different knowledge about HNVF exists concerning definition, identification, declaration and responsibility. Regarding the proportion of HNVF there is a wide range of variation from marginal to very high. The information level on HNVF of the involved stakeholders is ranging from good to bad, whereas the attitude of stakeholders ranges from very important to less relevant. Preliminary results were presented during the international workshop at AREC Raumberg-Gumpenstein (26th – 27th of May 2009) and are available via the project's website.
The responsible authorities concerning HNVF in the consulted countries are the Ministries of agriculture/environment, agencies of nature conservation, environmental agencies, regional authorities, agri-environmental policy offices or environmental ecology offices. There is still no final definition of HNVF in most of the partner countries including Austria. Draft versions about this important aspect of HNVF are available but there are still ongoing activities. Therefore contact persons named in the questionnaires will be contacted periodically to get actual information about the progress.

It became clear that the main types of HNVF will be permanent, extensive grassland, alpine meadows, pastures, semi-natural grasslands, floodplain meadows, wooded meadows and orchards. In any case and independent of the final definition of HNVF, the focused donor sites within the SALVERE-project are high nature value farmlands and therefore meet the given objectives!

Apart from the definition of HNVF it can be concluded that:

a) the return rate of the questionnaires was surprisingly high which clearly indicates the high ambition of all project partners
b) there still seems to be little knowledge on the topic of HNVF even this baseline indicator for RD-programs has to be considered in the current evaluation period (mid- term review 2010)
c) it can be expected that within the duration period of SALVERE there will be some progress in definition, data base and finally mapping of HNVF

2.2.2 Further, ongoing activities concerning the definition of HNVF

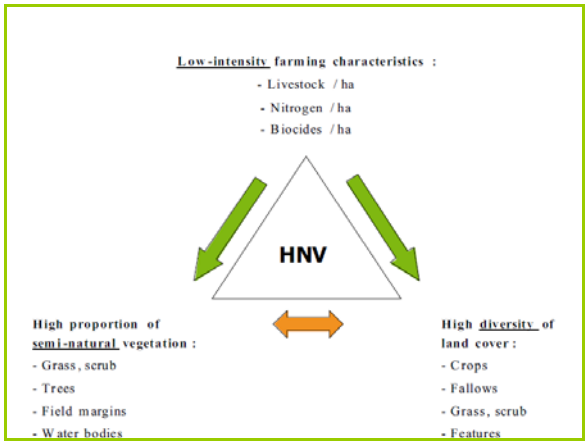


Figure 3 Three Keay Characteristics of HNV Farming

Proposals for defining and mapping High Nature Value farmland have been developed by the European Environment Agency (EEA) together with the Joint Research Centre (JRC) since 2003 (ANDERSEN et al. 2004, EEA 2005, JRC/EEA 2006). In 2007 a report and a separate guidance document to the Member States on the application of the HNV indicator was published on behalf of the European Commission, DG Agriculture (IEEP 2007a, b). This HNV Guidance Document is intended to assist Member States in developing a workable HNV monitoring framework. The document is developed from, and replaces, a draft HNV Guidance Document that has been in circulation since 2007. Both documents build on a study carried out for DG Agriculture of the European Commission in 2007 (IEEP, 2007). The intention of the HNVF concept is the link to biodiversity dependent on farmland habitats.

Following this demands HNVF comprises those areas in Europe where:

- agriculture is a major (usually the dominant) land use and
- where that agriculture supports or is associated with either a high species and habitat diversity
- or the presence of species of European, and/or national, and/or regional conservation concern,
- or both

Three types of HNVF are recognised (ANDERSEN et al. 2004, IEEP 2007a, b):

- Type 1 – Farmland with a high proportion of semi-natural vegetation.
- Type 2 – Farmland with a mosaic of low intensity agriculture and natural and structural elements, such as field margins, hedgerows, stone walls, patches of woodland or scrub, small rivers etc.
- Type 3 – Farmland supporting rare species or a high proportion of European or world populations.

Based on draft mappings of HNVF by EEA and JRC (JRC/EEA 2006a) a study on national verification and identification of HNVF in Austria has been elaborated (BARTEL and SCHWARZL, 2008). Therefore nationwide data on the distribution of threatened habitat types – dependent on extensive agricultural land use – and of bird species – associated with agricultural land – have been compiled. This analysis was performed at the spatial resolution of a 3 times 5 angle minutes grid (that is, in Austria, 6x6 km), which has also been used for the floral mapping of Central Europe. By means of IACS data (Integrated Administration and Control System for the management of CAP payments) on land use 2007, the potential agricultural area within the cells, where certain habitat types or bird diversity occur, was visualized.

- A High Nature Value farmland cell was defined as:
- Share of habitat-appropriate land use > 25 % of UAA
- Sum of habitat-appropriate land use > 100 ha
- Number of bird species > 25 % above the mean expected species number

By means of IACS land use data from 2007 the thus defined agricultural area was visualized within 1 km² cells. This resulted in a rather high share of potential biodiversity-relevant HNVF areas, making up about 50 % of the total agricultural area in Austria.

However, these results have to be interpreted carefully, for a change of the thresholds for the three criteria applied at the spatial scale of a 3x5 angle minutes grid would result in more or fewer HNVF areas. It has to be kept in mind that the result obtained should not be assessed on a small parcel scale, but used only to show regions where agricultural area contributes to biodiversity-relevant habitat types and high bird species diversity. Regionally differentiated thresholds could be used in the future to improve spatial analyses.

What can be concluded for the future work on identifying HNVF within a country is that a combination of both biodiversity assessment and well-defined agricultural management indicators is necessary to provide and develop a clearer picture of what can be addressed as high nature value farmland. Only in this can the underlying idea be represented and supported by using best available data within a country. Furthermore, according to the Guidelines for the evaluation of the Rural Development Programmes (IEEP 2007b), data on land use intensity and land use diversity (nutrient and pesticides input, livestock density, parcel size etc.) should also be taken into account.

Finally, it has to be said that the definition of high nature value farmland is still not consistent in the official documentation available to date. A conceptual definition of HNV farmland was developed by EEA, JRC and DG Agriculture, but no precise operational definition at national level is yet in place. A common operational definition cannot be achieved overnight, and therefore no final result of HNVF mapping at European or at national scale is as yet available. Neither the EEA/JRC approach (JRC/EEA 2006a) nor the different criteria proposed by the DG Agri-Report (IEEP 2007 a, b) provides an overall picture of high nature value farmland areas which integrates all possible aspects.

In Austria the Federal Ministry of agriculture, forestry, environment and water management at Vienna assigned another study to receive a final definition of HNVF – this study will be finished in 2010 and will also provide the declaration of HNVF for Austria (base line 2007 and status quo 2010).

Another questionnaire will be prepared and sent out to all partner countries within SALVERE in 2010 aiming at the update of the actual knowledge about HNVF and its definition.

3 Work package 4 Seed production of High Nature Value Farmland

At beginning of May our planned donor site was destroyed because of infrastructural interventions. It was very hard to find an adequate site. At last it was decided to use the Welser Heide as donor site for the experimental site as well. The donor site is cut once a year and not fertilised. The soil samples are in the laboratory and will be analysed soon.
Based on the late decision we were unable to carry out the phenological assessments in 2009. We could not collect the fertile stems of the 5 grasses and 5 herbs because of not knowing the phenological stage. All missing tasks of Work package 4 will be done next in the years 2010 and 2011.
AREC will carry out the assessment of seed germinability and viability of the 10 target species for all involved partners. We overtake this assessment voluntarily. That means, if we get the material from partners, we will do the assessment.

Considered species
The considered species of our donor site which will be collected in the year 2010 and 2011 to do the analysis and become the data for the
4.1 Seed production quantification
4.2 Evaluation of seed quality
4.3 Modelling of the seed production

5 Gräser	5 Kräuter
Arrhenatherum elatius	Knautia arvensis
Bromus erectus	Anthyllis vulneraria
Festuca rupicola	Salvia pratensis
Helictotrichon pubescens	Medicago lupulina
Trisetum flavescens	Diantus carthusianorum

4 Workpackage 5 Seed harvesting and treatment in High Nature Value Farmland

A characterisation and a map of the donor site and the activities of work packages 5 are described below. For all sites, the involvement in the different actions is indicated. The Arrhenatherion donor site was harvested at the first of July. Reasons for the late harvesting were bad weather conditions. The project partner 2 (AREC Raumberg-Gumpenstein) is involved in the following actions:

Work package 5 seed harvesting and treatment in High Nature Value Farmland

⇒ assessment of the efficiency of different methods in harvesting seeds from different types of semi-natural grasslands

⇒ estimate the costs of the different harvesting methods

⇒ assessment of the effects of seed harvesting on the botanical characteristics of the donor site

⇒ comparison of methods which can be used to assess the quality of the seed mixtures

⇒ improvement of the methods to separate and conserving seed of single species from the seed mixtures obtained from threshing

⇒ synopsis and evaluation of information concerning seed harvesting (not part of this report)

4.1 Overview and characteristics of study sites on Arrhenatherion (compulsory) and Molinion (voluntarily) communities in the first study year

4.2 Description of the donor sites

Project partner	2	2
Country	Austria	Austria
Type of donor community	**Arrhenatherion**	**Molinion**
Use of material	For flood detention basin Stillbach/ donor site Gumpenstein II-B	Weißenbach Monitoring plots
Involved in Action	WP4, WP5, WP6	WP 5, WP6
Description of the site		
Location	Wels Airport (see Figure 2)	Weißenbach/Liezen
Natural landscape unit	Eferdinger basin	Flood plains of the Enns River
Longitude (° from Greenwich)	48° 18' 27" N	47°33'41" N
Latitude (°)	14° 03' 98" E	14°11'34" E
Altitude (m a.s..l.)	c. 310 m a.s.l.	c. 640 m a.s.l.
Aspect (0 °= North, 90 °=East,...)	plain	plain
Slope (%)	0 %	0 %
Use of the site	Nature reserve	Nature reserve
Extension (approx.)	1.5 ha	3 ha
Geology	Molassezone, fluvial terraces, tertiary accumulation gravel, sand, clay	northern limestone alps, Palaeozoic greywacke and crystalline schist; Werfner strata with gypsum deposits

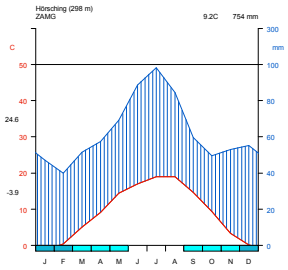
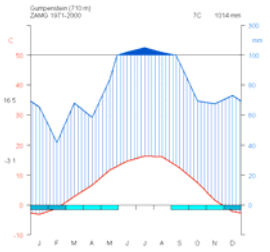
Description of the climate		
Mean yearly rainfall (mm) 1961-1990	753,8 mm	1014,1 mm
Mean rainfall in spring, summer, autumn and winter (mm)	192, 162, 344, 178	242, 271, 543, 232
Mean yearly temperature (°C) 1971-2000	8,8°C	7°C
Mean date begin vegetation period (mean daily temperature 5°C for sequently five days)	19.März	25.Mäz
Mean date end vegetation period (mean daily temperature 5°C)	7.November	4.November
Mean length of vegetation period	311	308
Climate chart		
Photographs June 2009		

Figure 4: Location of the donor site Welser Heide

Figure 5: Location of the donor site renaturation area old golf course, Ennstal valley

4.3 Soil survey of all donor sites

Soil of the study sites will be analysed in order to assess its physical and chemical properties and its fertility. On the 31st June 2009 the soil depth on the Arrhenatherion meadow was measured in each plot 5 times and it is shown in table 1. The measurement was done with a metal graduated stake up to a stone or rock. The measurement of the soil depth on the donorsite in Weißenbach will be done next year. The soil samples of the donor site Welser Heide and Weißenbach are collected at two layers (0-10 and 10-20 cm) and are currently analysed in the laboratory.

Table 1: The average values of the soil depth in block design.

	plot	soil depth [cm]
Block 1	1 GH	7,2
	2 OST	7,8
	3 NT	7,4
	4 OST 1	7
	5 SS	7,8
Block 2	6 OST	6,8
	7 NT	7,6
	8 GH	8
	9 OST1	6,8
	10 SS	7
Block 3	11 NT	7,8
	12 GH	6,4
	13 OST	8
	14 OST 1	7
	15 SS	6,6

Table 2: Parameters which are analysed from all donor sites

Description of the soil	**Results**
Gravel (%)	In progress
Sand (%)	In progress
Lime clay (%)	In progress
pH (in water/CaCl2)	In progress
Organic matter content (%)	In progress
Total Carbonate (mass-%)	In progress
Total Nitrogen (according to national rules) (mass-%)	In progress
Total Phosphorus (mass-%)	In progress
Total Potassium (mass-%)	In progress
Plant available phosphor mg per 100 g soil	In progress
Plant available magnesium mg per 100 g soil	In progress
Plant available potassium mg per 100 g soil	In progress

4.4 The efficiency from different harvesting methods of semi-natural grasslands.

4.4.1 Botanical survey

The botanical survey in Wels was done on 30th June 2009 on every plot in a subplot of 7x7m. The subplot is in the centre of the plot to avoid border effects. The projected cover of each layer, species and species group was visually estimated in percent. A survey of the phenological stadium of the meadow was done once just before harvesting. A list of all present species was made from the whole plot and the subplot.
Because of bad weather conditions and the late harvesting date, was not enough time for a complete botanical survey. If there is enough capacity it will be done next year 2010.

Figure 6: Doing the botanical survey in a subplot of 7x7m

4.4.2 Different methods of harvesting seeds

The best time of harvesting was estimated through phenological surveys of the main species. On the harvesting day the weather was very hot but cloudy. Based on the rain period it was humid with about 85 % humidity. The wind speed was low.

In general:
The ratio between surface donor site and surface receptor site depends on the seed production of the donor site. Therefore, for GH and OST, the extension of harvested donor site and extension receptor site must be determined. After determination of fresh and dry weight of the different materials it is possible to calculate:

- yield per ha on the donor site
- amount of applied material per ha on the receptor site
- ratio area donor site : receptor site

Not treated (NT)
On the not treated (NT) plots the data for Work package 4 will be collected during the following two years. After finishing the botanical survey the plot was mulched.

Green hay (GH)
To determine the ratio of seed production between donor site and extension receptor site one m^2 of the plot was cut and weighted. The weight of the material of the subplot for green hay was about 1.5 kg. Based on experience data and the weight of the subplot the ratio donor site to receptor site 1:2 is recommendable to make sure of a sufficient cover with plants and grasses on the experimental site. The size of the donor site 30x30 m compared to the experimental site with 12x14.5 m. Green hay, on-site threshing material and the material of the seed stripper was harvested on the 1st July 2009 one day after the botanical survey was done.
The green hay was cut with a mower, raked

Figure 7: View on the cut green hay plot at the Welser Heide

together, put it into big bags and transferred by truck from Wels to Gumpenstein. On the same day the green hay was applied at the experimental site in Gumpenstein.

On-site threshing (OST, OST1)

On-site threshing material was harvested on the same day as the green hay was harvested. The plots were harvested in two different methods The fields of the OST-variant (2, 6, 13) are used to implement the experimental site. The OST plots were threshed with a CLAAS 320 Tucano thresher. The variants OST1 (4, 9, 14) were threshed with the Wintersteiger classic thresher. This material will be used to define the quantity and the quality of the seed mixture. This data will be compared with the data of the seed stripper. The threshed material was dried for 3 days in a chamber at room temperature. Afterwards it will be cleaned and analysed.

Figure 8: The CLAAS 320 Tucano thresher

Figure 9: The Wintersteiger classic thresher

Seed stripper (SS)

The fields of the SS-variants (5, 10, 15) were harvested with a pull-type seed stripper model no. 610, serial no. 0440806 imported from Canada (Prairier habitats Inc.) drawn by the Wintersteiger classic thresher at a speed of 3 km/h. Due to the advanced phenological stage on-site, it was decided to fix the brush axes at 15 cm to get enough seeds from herbs, resulting in getting stems from grasses into the harvested material (see figure 9). The SS plots have the same assignment as the OST1 plots. These plots are harvested to test the quality of the seed mixture. The material of the seed stripper was dried for 3 day in a chamber at room temperature, weighted, cleaned and analysed.

Figure 10: pull-type seed stripper Model No. 610 imported form Canada

Figure 11: Harvested material from the pull-type seed stripper

4.5 First results of the botanical survey

The following figures and tables show the first results of the donor sites Welser Heide (Arrhenatherion meadow) and Weißenbach (Molinion meadow) in the first project year.

4.6 Arrhenatherion meadow Welser Heide (compulsory)

The materials from the donor site (Arrhenatherion - grassland from Welser Heide) are used to set up the experimental site Gumpenstein II-B. The donor site was harvested in July 2009. The green hay variant was immediately implemented after cutting on the experimental site. The on-site threshing material was threshed on the 25th August 2009. All harvesting trials GH, OST, NT, OST1 and SS are carried out in block design with replications in order to allow statistical analyses. To manage the experimental trails the mowing regime depends on the plant community, one or two cuts according to the usual management. In the first year, the green hay was mown once to control the unwanted weeds. The materials from the harvesting techniques OST 1 and SS are to be analysed in the laboratory and to question if the harvesting method has any influence on the meadow.

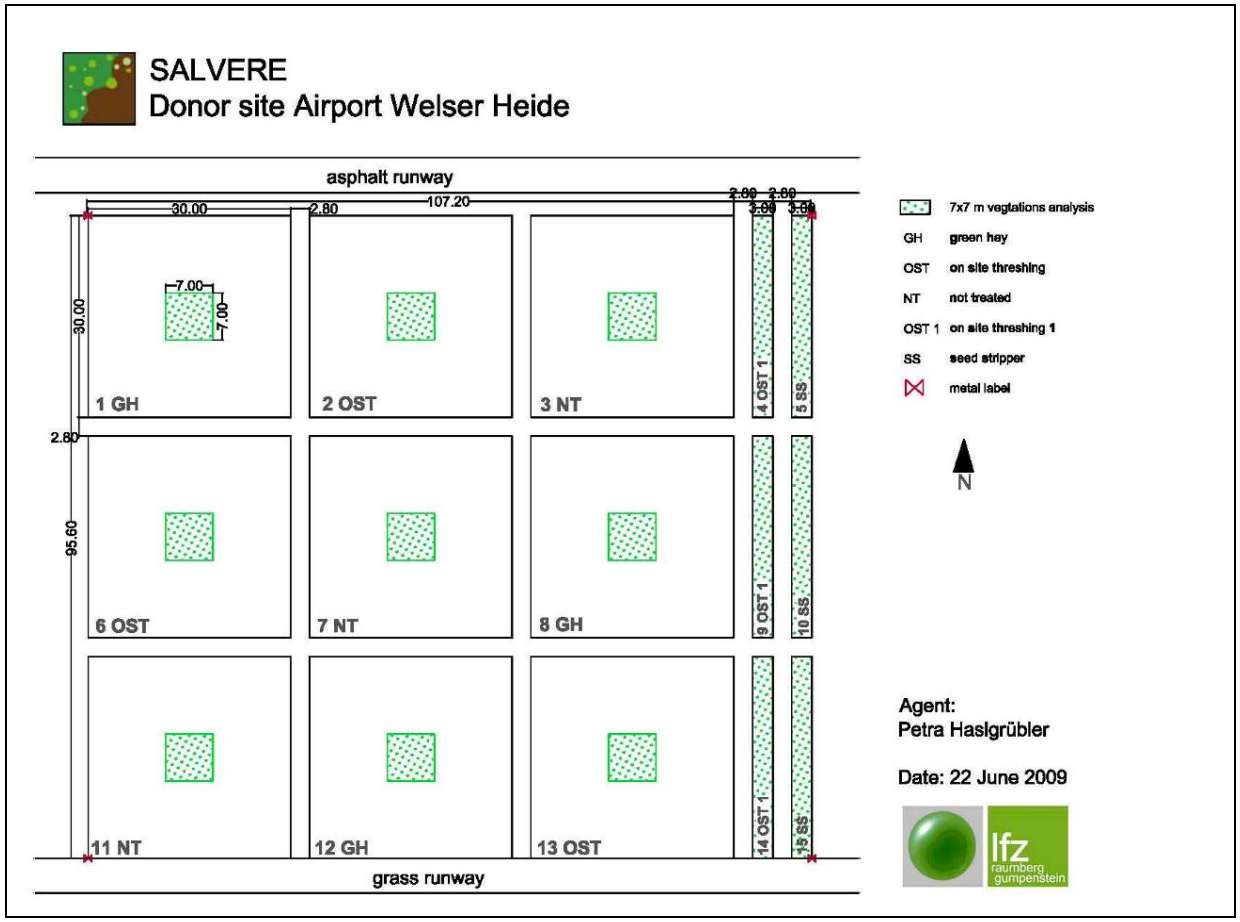


Figure 12: Map of the donor site Welser Heide

4.6.1 Results of the botanical survey

On each plot before harvesting (first and second cut), the percent coverage of each layer, species group and species was visually estimated.

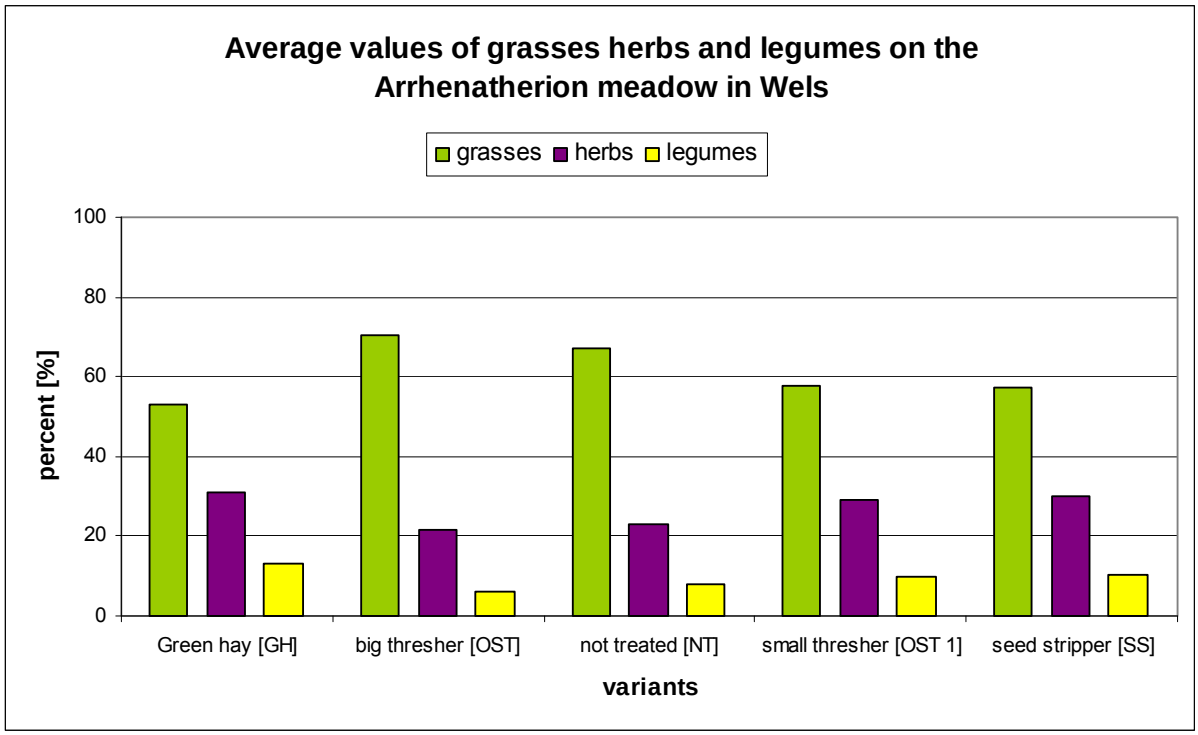


Figure 13: Average values of the vegetation analysis on the Arrhenatherion meadow of the different harvesting techniques.

Table 3: species list of the Arrhenatherion meadow shown in block design and percent

	Block 1					Block 2					Block 3				
	1 GH	2 OST	3 NT	4 OST1	5 SS	6 OST	7 NT	8 GH	9 OST1	10 SS	11 NT	12 GH	13 OST	14 OST1	15 SS
grasses															
Agrostis gigantea			2			4									
Anthoxanthum odoratum												0,3			
Arrhenatherum elatius	15	12	11,5	13,7	14	9,8	13,5	19	19	8,3	14,5	17,4	21	14	14
Avenula pubescens	14,5	19	19	13	12	11,3	14,7	9,5	9,5	9,5	17,5	7,5	13,5	11,5	9,5
Bromus erectus		4	2	3	4	2	3	2	3	9,5	1	3	3	11,5	5
Bromus inermis										1				2	3
Bromus sterilis						2	0,3			0,7					0,5
Dactylis glomerata	2	2	2	3	3	2	3	3	3	3	3	2	2	2	4
Elymus repens			2				1								
Festuca pratensis	3	3	2	3	3	6	4	5	3	5	6	4	5	4	4
Festuca rubra	5	8	8	8	6	9,8	9	7	6	5	8	6	7	7	7
Festuca rupicola		3	5	1	2	9,8	3	3	3	2	5		3	1	3
Phleum pratense	2	2	2	0,3		0,3	2	2	1	1			1	2	0,5
Poa angustifolia	2	1	3			3	4	1			2	3		1	1
Poa annua												0,3			
Poa pratensis	5	14,5	8	5	8	8	6	5	7	9,5	10	4	5	6	8
Trisetum flavescens	3	2	1	4	2	2	1	2	1	2	2	1	1	2	2
legumes															
Anthyllis vulneraria	1	1	1	3,3	3		1	2	1	1			0,5		
Lotus corniculatus	3,5	4		2,7	1	2	1	1	0,3	1	1	2			1
Medicago falcata				2	1		1	0,3	1		1,3	3	8	2	1
Medicago lupulina				0,3	0,7		1			0,7		1			0,3
Securigera varia	1		5	2,7	3,3		1	6,4	4	2,6	2	5,5	1	1	4,2
Trifolium campestre	1		1	1	1	1	2	2	0,7	0,7		2	2	1	1
Trifolium pratense	1	1	1	1	1	1	2	3	2	2	0,7	3	3	1	1
Trifolium repens		2	1	1	2		1	0,3	1	1		1	0,5	1	
herbs															
Achillea millefolium	3	4,1	3	2,7	3	4,5	3,5	2	5	2	8	3,7	3,8	3	2
Acinos arvensis	0,5	0,7	0,3	0,3	1	0,7	1	0,3	1		0,7	1	0,3	1	0,3
Campanula patula													0,3		
Centaurea jacea	1	0,7	1	1	1	1	1		2	1		2	1	1	1
Centaurea stoebe				1			1		0,3	2		1	0,3		
Cerastium holosteoides							0,7								
Convolvulus arvensis	1				0,3					2	0,3				1
Daucus carota	1			1								1			
Dianthus carthusianorum	2	2	1	2	2	0,7	3	2	2	2	1	3	1	1	1
Echium vulgare					0,3				0,3				0,8	1	
Erigeron annuus				0,7											
Euphorbia esula	2	1	1												1
Fallopia sp_												0,3			
Foeniculum vulgare				0,3	0,3				1	0,3		0,3			0,3
Fragaria sp_											0,3				
Galium album	11,2	3	3,5	6	4	7,8	3	5,3	7,2	5,8	5	3,7	3,7	7	7,1
Galium verum				1	1							1		1	1
Hypericum perforatum					1				1						
Knautia arvensis	1	1	2	1	1	1	2		1	1	1	1			1
Leontodon hispidus				2						1	2				
Mentha sp_														0,3	
Pastinaca sativa	2	2			1	2		2	1	1		2		1	2
Pimpinella major			1					0,4							
Plantago lanceolata	1	1	2	2	2	0,3	1	0,7	2	1	1	1	1	1	1
Plantago media						0,7				0,7					
Potentilla erecta	2		0,3			2	0,5	0,3			1	1	1	0,3	
Potentilla recta					3										
Rhinanthus sp_					0,7									0,3	
Rumex acetosella							0,3			0,3		1			
Salvia pratensis	6	1	3	3	3,7	3	3,7	5	4	6,1	3	3	2	3	4
Sanguisorba minor	0,3						0,3	0,5				1		0,7	
Sedum sexangulare		1		1	1			1	0,7	1				0,4	
Silene vulgaris	1		1	1	1	0,3	1	2	1	2	1	1	2	2	3
Taraxacum officinale		0,7													
Thymus praecox	3	1	2	2	3,7		0,7	3	2	3		2	3	2	0,3
Veronica chamaedrys		0,3					0,3		1		0,7	1	1	1	1
Veronica serpyllifolia			0,4							0,3			0,3		

4.6.2 Lab analyses seed quantity/quality

Subsamples of every harvesting method of 1x1 m^2 in three replicates were taken and weighted. The different weights of the plots are shown in table 4.

Table 4: Size and average weight of harvested plots on the Arrhenatherion meadow in Wels

average weight - harvesting plots - donor site

	plot size [m^2]	moit mass [g]	dry mass [g]	chaff [g]	pure seeds [g]
NT		the NT variant was mulched			
GH	900	470400	91500	86446	5054
OST	900	0	9950	6044	3906
OST1	90	2597	1377	770	607
SS	90	1350	776	581	195

In the lab the harvested material was dried. Half of the material was conserved in a cooling chamber with 2-3 °C and 40 % humidity and the other half is in the storage room under normal conditions with room temperature. We try to find out if the storage in the cooling chamber has any influence on the germination of the seeds. The following analyses were done block per block and regard the seed quantity and the quality. All seed samples (GH 50g, OST 50g, OST1 5g and SS 5g) are separated, counted and weighted. In the following diagram the results in percent of the analysis are shown.

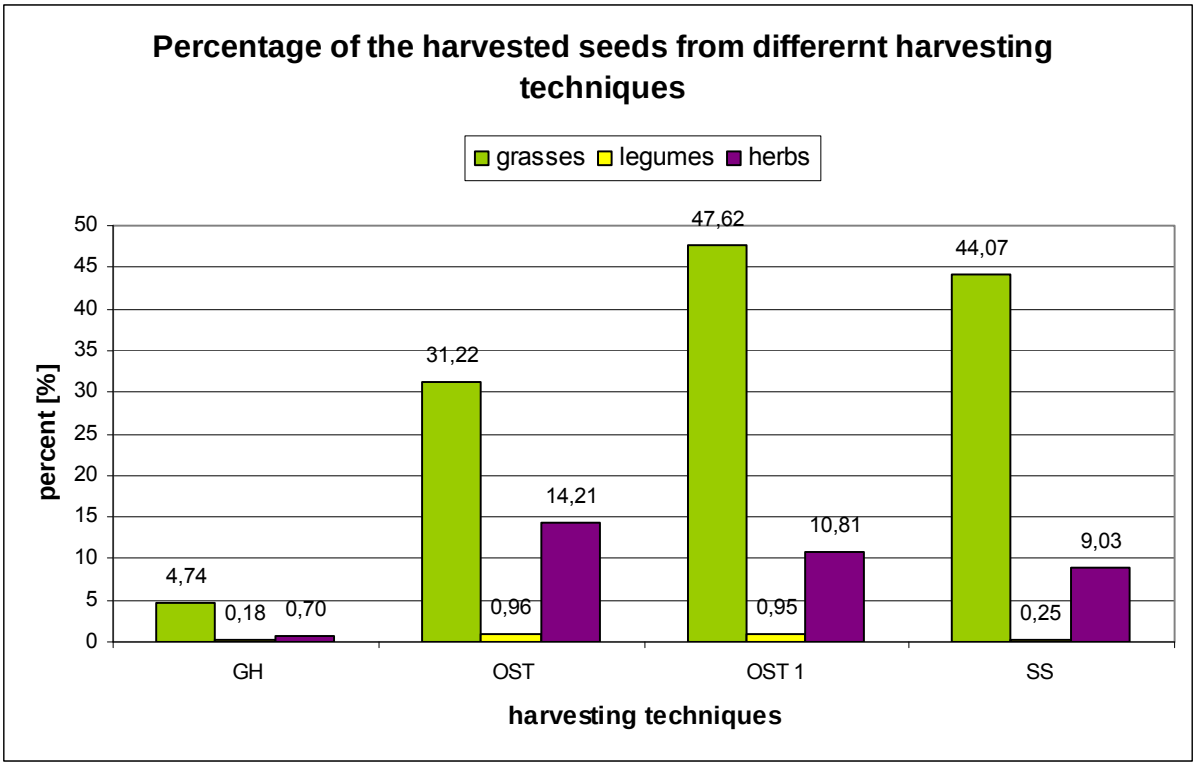


Figure 14: Percentage of the harvested seeds from the different harvesting methods after the seed separation

For five important species, the quality of the harvested seed will be tested. Four replicates of at least 50 mature seeds for each harvesting methods will be prepared. On the seeds a pre-germination treatment according to ISTA or our own experience will be applied. The germination will be done on the Jacobsen Apparatus. A tetrazolium test will be done if the seeds not germinated in the germination trial. The total viability will be the sum of germinability.

4.7 Molinion meadow Weißenbach (voluntarily)

The threshed material of the donor site Weißenbach was used to set up the area with the nine Monitoring fields in Weißenbach right next to the golf course. The material was harvested in 2006. During the summer 2009 vegetation analysis were done and also subsamples with the small thresher and the seed stripper were taken. The tasks are voluntarily and will be done in the laboratory if there is enough time and working capacity. The Molinion meadow S2 the tall sedge swamp was harvested in August 2009. S1 the *Molinion caerulea* rich litter meadow and S3 *Iris sibirca* rich litter meadow were harvested in the middle of September.

Figure 15: Map of the donor site Weißenbach

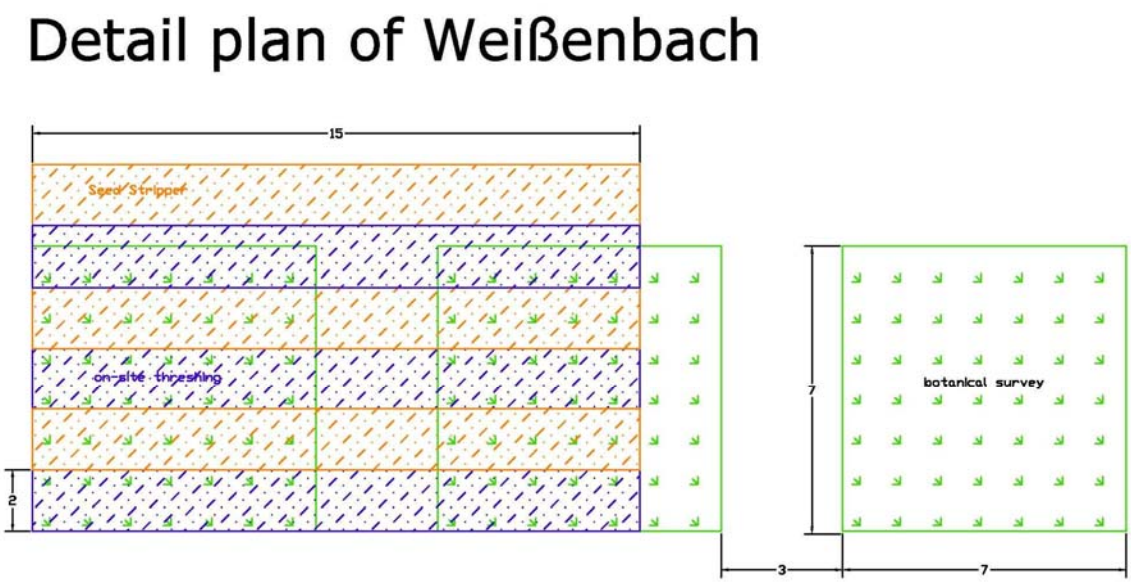


Figure 16: detail plan of the donor site in Weißenbach; botanical survey and subsamples of the harvesting techniques

4.7.1 Results of the botanical survey

On each plot before harvesting (first and second cut), the percent coverage of each layer, species group and species was visually estimated. The following diagram shows the results of the first botanical survey.

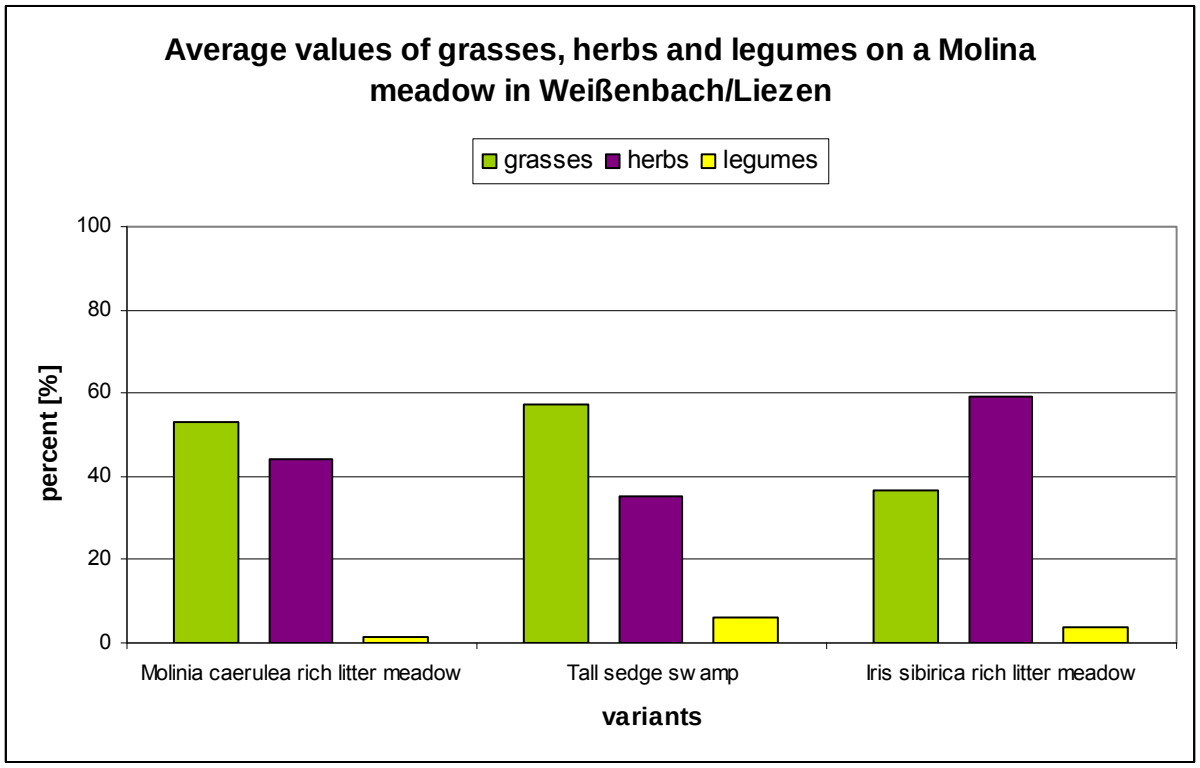


Figure 17: Average values of the vegetation analysis on the Molinion meadows

Table 5: species list of the Molinion meadow shown in block design and percent

plots	Molinia caerulea rich mitter meadow			Tall sedge swamp			Iris sibirica rich litter meadow		
grasses [%]									
Agrostis capillaris				1				1	
Agrostis gigantea							0,3	3	
Agrostis stolonifera						0,3			
Alopecurus geniculatus							2	0,3	0,3
Anthoxanthum odoratum				0,7	0,7	0,3			
Avenula pubescens				1	0,3	0,7			
Briza media				2	3	3			
Carex flava	2	2	1	2	2	3	0,3		
Carex lepidocarpa	6			1	2	1			
Carex pendula			3	4	2	5			
Carex riparia						0,3	0,7	0,3	1
Carex sp_	1			8	14,4	8,5	4	2	3
Dactylis glomerata							2	1	3
Deschampsia cespitosa				1	0,7	2			
Elymus repens							2	1	1
Festuca pratensis					2	0,3		0,4	
Festuca rubra				2	0,3	2	3,1	5	3
Glyceria fluitans						0,3	2	2	3
Holcus lanatus				1	0,3	0,3			
Juncus arcticus				2	2	3			
Juncus articulatus		3	1	7,7	5	6			
Juncus inflexus				2	6	3			
Juncus sp_				3	4	1			
Lolium perenne							4	3	2
Molinia caerulea	24	20	20	2	5	10	0,3	3	2
Phalaris arundinacea							0,3		
Phleum pratense		2	2	5	4	2	7	5	6,7
Phragmites australis				0,3		1			
Poa pratensis				2	0,3	1	3	3	2
Poa trivialis				0,3			4	2	3
Scirpus sylvaticus	23	23	26,7	5	5	6	5	3	5
legumes [%]									
Lathyrus pratensis	2	0,7	0,3	2	1	1,3	1,5	3,5	2,7
Lotus corniculatus	0,5			2	1	0,5			
Lotus pedunculatus							0,5	1	
Medicago lupulina				0,5					
Trifolium hybridum				1	3	0,3			
Trifolium pratense				1	1	0,3			
Trifolium repens				1	1	0,3			
Vicia cracca	0,5	0,3		0,5	1	0,3	1	0,5	0,3
herbs [%]									
Achillea millefolium	2		0,7				4	3	2
Aegopodium podagraria	0,7			1	2	0,3	0,7	0,3	0,3
Alisma plantago-aquatica								0,3	
Angelica sylvestris	2	3	2	3,7	3	2	2	0,3	
Artemisia vulgaris							1		
Caltha palustris	0,3			2	1	0,3			
Cardamine pratensis						0,3		0,7	
Carum carvi	3			3	2	5			
Centaurea jacea	3	3	2	1	0,3	1	3	2,3	0,3
Cerastium holosteoides				0,3					
Cirsium arvense							5	3	5
Cirsium oleraceum	2	1	1	2	0,3	2	2	3	2
Cirsium palustre	1						0,3	0,3	
Equisetum palustre	1	0,3	0,3	2	0,4	0,7			
Eupatorium cannabinum						1	0,3		
Euphrasia sp_				0,7	0,3	0,3			
Filipendula ulmaria	2	1	7	3,7	3,4	1	6	5	4
Galium palustre	2	0,3		1	2	3	0,3		
Galium sp_		1	0,7				3	4	3
Galium verum						0,3		0,3	0,3
Geranium sp_	0,3	1	1			0,7		0,7	
Glechoma hederacea		0,3	0,3				0,3		
Hypericum sp_			0,3						
Hypericum tetrapterum						0,7			
Iris sibirica	10,7	20,5	16,5	5	3,4	1	9,3	22	31,5
Leucanthemum vulgare				1	2	4			
Lychnis flos-cuculi					0,7	0,3			
Lysimachia nummularia					1				
Lysimachia vulgaris	1	2	0,3	0,7	0,3	1	4	1	5
Lythrum salicaria	2	3	1	1		4	2	2	0,3
Mentha aquatica			0,3		0,7	0,3	0,3	0,7	0,7
Myosoton aquaticum					0,3				0,3
Pedicularis sylvatica								0,1	
Peucedanum palustre	1	3	1	2	2	0,3	0,3		
Pimpinella major			1	1			1	1	1
Pimpinella saxifraga							0,3	0,3	
Plantago lanceolata				1				0,7	
Potentilla alba									0,3
Potentilla erecta	0,7	0,3	0,7	1	2	2			
Prunella grandiflora			0,3	1	0,3	0,5			
Prunella vulgaris				0,3			0,3		
Ranunculus acris	0,3	0,3	0,3	1	1	1	1		
Ranunculus auricomus agg_			0,3						
Ranunculus repens				1	0,3			0,7	
Rorippa palustris							0,7		0,7
Rorippa sp_							0,3	0,3	
Rubus caesius								2	
Rumex crispus							0,7	1	0,3
Rumex obtusifolius							0,3		
Sanguisorba minor									0,7
Scopolia carniolica							1		
Scrophularia umbrosa					0,7	0,3	0,3		0,3
Scutellaria galericulata					0,3		0,3		0,3
Serratula tinctoria			0,7	0,3	1	1			
Silene latifolia ssp_alba				0,3	0,3				
Sonchus oleraceus							2	0,3	
Stachys palustris								1	
Stellaria graminea									0,7
Taraxacum officinale agg_							0,3		
Thalictrum aquilegiifolium	1	2	0,3				0,7	0,7	
Thalictrum lucidum	4	6	5	1	1	0,7	4	2	2
Valeriana officinalis			1						1

4.7.2 Sample lab analyses seed quantity/quality

The Molinion meadow is owned by a farmer and also mown by him. The tall sedge swamp was mown on 25th August 2009 and the Molinion caerulea rich litter meadow and the Iris sibirica rich litter meadow were mown on the 15th September 2009. Subsamples of the harvesting method OST1 and SS were taken at the end of August, dried and stored. The seed separation, germination, viability and the 1000 seed weight will be done next year. The material is stored in the cooling chamber by 2-3°C with 40 % humidity. The seed separation in the exact fractions will be done next year.

Table 6: Size and average weight of harvested plots on the Molinion meadow in Weißenbach

			average weight of the suplots			
	size [m^2]	variant	moit mass [g]	dry mass [g]	seeds [g]	chaff [g]
Iris sibirica rich litter meadow	22,5	OST1	3107	1367	1020	347
	22,5	SS	1040	473	200	273
Molina caerulea rich litter meadow	22,5	OST1	973	493	347	147
	22,5	SS	470	253	113	140

4.8 Harvesting costs

In this chapter the harvesting costs are explained. First the harvesting times from the different meadows are shown. Next is a table with results of the literature research of harvesting costs. The prices are from the ÖKL Homepage Austria and were researched in August 2009. At the end is a table with the real harvesting costs.

4.8.1 Harvesting Times

The Arrhenatherion meadow Welser Heide was harvested on the 1st of July 2009. The Green hay was implemented right after harvesting and the on-site threshing material was sown on the 25th August 2009. The materials from the harvesting techniques OST 1 and SS will be analysed in the laboratory and to question if the harvesting method has any influence on the meadow. The Molinia meadow S2 (the tall sedge swamp) was harvested in August 2009. S1 (the *Molinion caerulea* rich litter meadow) and S3 (*Iris sibirca* rich litter meadow) were harvested in the middle of September.

	Welser Heide	Weißenbach
GH	1st July 2009	
OST	1st July 2009	
OST 1	1st July 2009	
SS	1st July 2009	
silage		S2: 25th August 2009 S1, S3: 15th September 2009

4.8.2 Harvesting cost from the literature research

Table 7: Calculated costs from the ÖKL Homepage in August 2009

Variante 1 Green Hay					
Activity / Machine	price per Hour [€/h]	working hour [€/h]	tractordriver per hour [€/h]	€/ha	total
standard tracotr with rear wheel drive 60 kW (82 PS)	21,14	0,00	10,00		31,14
double rotary mower 165 cm	8,28				8,28
self-loading bale trailer - 6 cutsites 20 m³ (13,1 m³ after DIN)	20,35		10,00		30,35
10% addition green hay self-loading bale trailer					3,04
harvest / apply the green hay from 2 persones		20,00			20,00
Total price for 1 €/ha GH	49,77	20,00	20,00		**92,81**

Variante 2 Green Hay					
mower 5,8 kW (8 PS)	27,08	10,00			37,08
standard tractor with rear wheel drive 60 kW (82 PS)	21,14		10,00		31,14
trailer to transfer t/h oneaxialdumper 25 km/h 5,0 t	5,20				5,20
harvest / apply the green hay 2 persones		20,00			20,00
other costs					0,00
Total price for 1 €/ha GH	53,42	30,00	10,00		**93,42**

On Site Threshing					
Activity / Machine	price per Hour [€/h]	working hour [€/h]	tractordriver per hour [€/h]	€/ha	total
harvester-thresher incl. chopper 60 kW (82 PS)	127,03		10,00		137,03
fourwheel tractor with rear wheel drive 120 kW (163 PS)	48,78		10,00		58,78
trailer to transfer t/h oneaxialdumper 25 km/h 8,0 t Tandem	9,53				9,53
drying				150,00	150,00
cleaning				70,00	70,00
storage bigpack 3 months					20,00
other costs					0,00
Total price for 1 €/ha OST	185,34	0,00	20,00	220,00	**445,34**

Not Treated (hay making)					
Activity / Machine	price per Hour [€/h]	working hour [€/h]	tractordriver per hour [€/h]	€/ha	total
standard tractor with rear wheel drive 60 kW (82 PS)	21,14		10,00		31,14
trailer to transfer t/h oneaxialdumper 25 km/h 5,0 t	5,20				5,20
mulch per ha					0,00
other costs					0,00
Total price for 1 €/ha NT	26,34	0,00	10,00	0,00	**36,34**

small thresher

Activity / Machine	price per Hour [€/h]	working hour [€/h]	tractordriver per hour [€/h]	€/ha	total
harvester-thresher incl. chopper 55 kW (75 PS)	106,84				106,84
standard tractor with rear wheel drive 60 kW (82 PS)	21,14		10,00		31,14
trailer to transfer t/h oneaxialdumper 25 km/h 5,0 t	5,20				5,20
drying				150,00	150,00
cleaning				70,00	70,00
storage bigpack 3 months					20,00
other costs					0,00
Total price for 1 €/ha OST 1/SS	133,18	0,00	10,00	220,00	**383,18**

Seed stripper

Activity / Machine	price per Hour [€/h]	working hour [€/h]	tractordriver per hour [€/h]	€/ha	total
Seed stripper	30,04				30,04
standard tractor with rear wheel drive 60 kW (82 PS)	21,14		10,00		31,14
trailer to transfer t/h oneaxialdumper 25 km/h 5,0 t	5,20				5,20
drying				150,00	150,00
cleaning				70,00	70,00
storage bigpack 3 months					20,00
other costs					0,00
Total price for 1 €/ha OST 1/SS	56,38	0,00	10,00	220,00	**306,38**

fieldpreparation GUMPII/B

Activity / Machine	price per Hour [€/h]	working hour [€/h]	tractordriver per hour [€/h]	€/ha	total
fourwheel tracotr with rear wheel drive 120 kW (163 PS)	48,78		10,00		58,78
drainage plough, 1scharig 70 - 120 cm depth	3,68				3,68
other costs					0,00
Total price for 1 €/ha OST	52,46	0,00	10,00	0,00	**62,46**

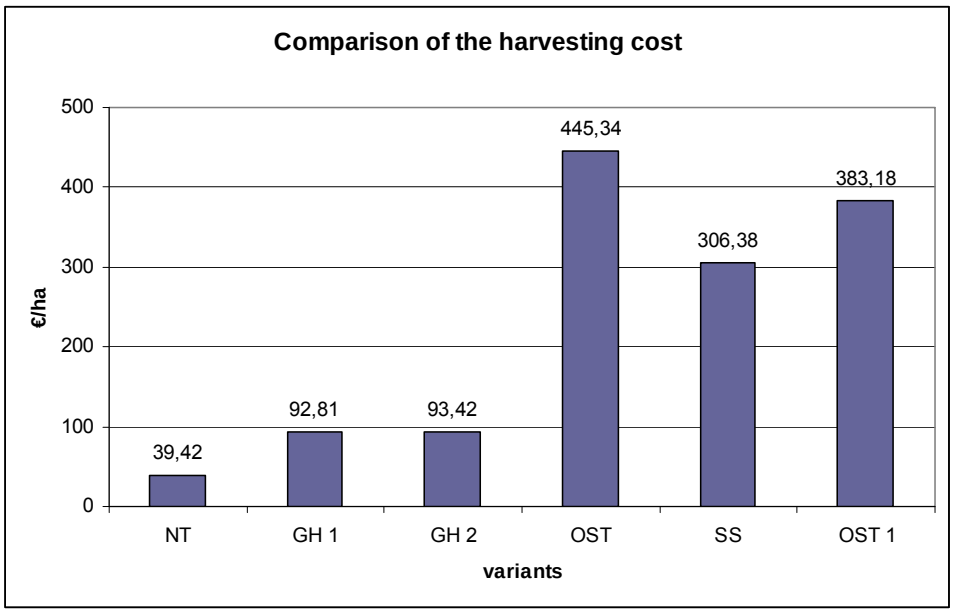


Figure 18: Comparison of the different harvesting costs researched on the ÖKL Homepage in August 2009

4.8.3 Real harvesting costs

Table 8: List of the real harvesting costs per unit.

Harvesting Method	**Green hay**
Number of trial	1
Type of Community:	Arrhtenaterion
Harvesting date	01. Jul 09
Size of harvested surfaces	900 m^2
Harvesting time per harvesting trail	30 min
Raw weight of harvested propagation material	1,47 kg/ m^2
Pure seed obtained	
Costs per unit harvested surface (ha)	
Costs per unit harvested weight of raw propagation material (t)	€/t
Costs per unit harvested pure seed (kg)	€/kg

Harvesting Method	**On Site Threshing**	
Number of trial	1	1
Type of Community:	Arrhenaterion	Molinion
Harvesting date	14.Jul.09	
Size of harvested surfaces	120 m²	
Harvesting time per harvesting trail	35 min/ha	
Raw weight of harvested propagation material	290kg/ha	
Pure seed obtained	81 kg/ha	
Costs per unit harvested surface (ha)	€ 120/ha	
Costs per unit harvested weight of raw propagation material (t)	€ 414/t	
Transport overall per kg	€ 0,20/kg	
Costs per unit harvested pure seed (kg)	4,39kg	
Manipulations costs		
Drying per ha	€ 150/ha	
Cleaning per ha	€ 70/ha	

Harvesting Method	**Seed stripper**	
Number of trial	1	1
Type of Community:	Arrhtenaterion	Molinion
Harvesting date	01. Jul 09	
Size of harvested surfaces	90 m^2	
Harvesting time per harvesting trail	20 min	
Raw weight of harvested propagation material	1,35 kg	
Pure seed obtained		
Costs per unit harvested surface (ha)	120 €/ha	120 €/ha
Costs per unit harvested weight of raw propagation material (t)	€/t	
Costs per unit harvested pure seed (kg)	€/kg	
Manipulations costs		
Drying per ha	€ 150/ha	€ 150/ha
Cleaning per ha	€ 70/ha	€ 70/ha

4.9 Quality of the seed mixture

The analysis foreseen in action 5.4 will be done in 2010. The harvesting methods which will be considered at AREC are the materials from the small thresher OST 1 (compulsory) and the Seed stripper SS (voluntarily). The germination of the two harvesting methods (OST1 and SS) will be done in the greenhouse under defined conditions.
The seed mixture will be separated into grasses, legumes and herbs. The germination will be done in spring, as the germination trials foreseen for the Actions 5.1 and 4.2.
The treatments will be replicated three times. During the germination trial, the germinating seeds will be counted and divided at least into grasses, other monocots and dicots (if possible into single species). Moreover, a viability test on the not germinated seeds (a sample divided into the three species groups) will be carried out if it is possible. The material will be treated as defined in ISTA 2009.

4.10 Seed separation and Conservation

The harvesting methods considered will be OST1 and SS. The seed separation into single species will be done with laboratory seed cleaning machinery and afterwards by hand. The Assessment of the quality of separated seeds, the germination and the purity assessment, will be done under controlled conditions following the International Rules of Seed Testing (ISTA).

Workflow from threshing - seed separation to conservation

1. Thresher 2 shaking sieves in different sizes
2. Drying in the air chamber by cold/hot air - not over 37°C because of germination capacity
3. Intermediate storage in the cooling chamber with 2-5°C and 40% humidity
4. Depending on the weight; cleaning with the right machine
5. testing the purity of a sample (technical purity from the ISTA)
6. Storage in the cooling chamber in a defined system

4.10.1 Drying of the harvested material

At AREC the harvested material will be dried with hot or cold air. Hot air should not be more than 37°C because afterwards the germination capacity of the seeds will be destroyed. Normally the material will be dried by room temperature for at least three days. It depends how wet the material is.

Figure 19: Drying of the harvested OST1 material by room temperature

Figure 20: Drying of harvested SS material by room temperature

Figure 21: The drying system of AREC

4.10.2 The Machines to clean seed samples in small and big fractions

Röber Mini-Petkus

The MINI-PETKUS has been designed as a laboratory machine; it meets all requirements of a modern seed cleaning machine, performing all necessary functions. The built-in fan provides a large air volume for the suction in the vertical main aspiration. The sieves are cleaned by means of an automatic vibrator unit. Efficient operation and compactness result from the built-in indented cylinder arrangement. Also very quick and easy changed of the indented cylinders. Only a extremely short time required for changing type of sorting to suit change in varieties or grains. All grading operations are clearly visible when the machine is in operation and can be adjusted quickly and easily if required. The machine is self- emptying within a very short period of time. The machine is manufactured in standard units – separate items such as deawner, indented cylinder and support table can be added as required. The support table is equipped with a holder for interchangeable sieves. The grading result is in correspondence with that achieved in practical operation with a high- capacity seed cleaner and grader. The RÖBER MINI-PETKUS therefore is the ideal machine for use in laboratories of scientific institutes, seed breeding and testing stations. (Source: Waldenburg Catalogue 2009)

Technical data

Sieve Area	1 upper sieve
	1 lower sieve

	approx. 0.38 m^2
Indented Cylinder	1 indented cylinder 375 mm Ø, 325 mm length Grading area 0.35 m^2
Drive	230/ 400 V, 50 Hz, Enclosure IP 54 Insulation class B 1.5 kW (De- awner 0.37 kW)
Dimensions	length 2477mm Width 701 mm Height 1150 mm with support table 2078 mm Weight: 220 kg

Figure 22: Röber mini pectus from the company Baumann

Figure 23: Detail of the two sieves on the Röber mini pectus

Seed cleaner for small samples – SCHLINGMANN

The small sample cleaner SCHLINGMANN was developed with a feeding pipe with flap, wooden catch container with plastic pane and ventilator with switch and transformator for infinitely variable air stream. The seeds are put in the feeding channel. Depending on the desired cleaning intensity of the seeds it is possible to regulate the air stream speed of the ventilator with the transformator or by opening the flap of the feeding pipe. The heavy seeds fall down through the feeding pipe; the lighter seeds go in the wooden container, where they can be removed by the drawer. (Source: Waldenburg Catalogue 2009)

Advantages
constant stream of material
variable, adjustable
with adjustable funnel
maintenance- free, CE- conform

Technical data:

Dimensions:	40 x 50 x 50 cm
Weight:	10 kg
Width of the groove	40 mm
Volume of the funnel	2,8 l

Figure 24: Seed cleaner SCHLINGMANN for smal samples

Figure 25: Detail of the seed cleaner SCHLINGAMNN

Air separator

Figure 26: Air separator

The “Saugluft- Stufensichter” type 2 (small type) and type 3 (bigger type) are suitable for plant breeding stations where exact wind separation is required. Separation into 1st (heavy), 2nd (medium) and 3rd (light) grade is done. The infinitely adjustable air separation enables in many cases fine sorting out of germinating and not germinating seeds and grains. The “Saugluft- Stufensichter” works exclusively with air separation and is equipped with a vibration feeder as accessory or a big plastic funnel, permitting a proportionate filling-in of the material. The front side of both machines is covered with easily removable windows, which permit the observation of the grading process in the uniflow air channel. Even in case of fine seeds there is no danger of mixing. It has to be considered that the capacity is dependent on the soiling of the seed and the cleaning result required. Strictly speaking, the most important effect of these machines is not to reach a high capacity per hour, but to achieve exact cleaning results by simultaneous elimination of the danger of mixing of seeds or grains. (Source: Waldenburg Catalogue 2009)

„ALLESDRESCHER“ Universal Threshing Machine,

Figure 27: The Universal Thresching machine

This Machine is suited for threshing and grating of cereals, clover and grass, vegetable legume and other seeds. The threshing process takes only a few seconds. The “Allesdrescher” work fast and is easy to operate. Large, detachable windows at the front side of the threshing drum and of the precision-air-separator permit observation of the threshing and the separation process and give full survey into the interior of the threshing drum and the separator. There is no damage to seed and grains because of smooth walls and rubber like beaters; correctly chosen threshing baskets (for very sensitive material rubber baskets) and infinitely adjustable speed control. No mixing of seeds and grains because steep walls prevent leftover seeds and grains, and large detachable windows permit observation of the threshing drum and the separator. Hundred percent yield of threshing because the material remains in the threshing drum until completely threshed out. No loss of seeds and grains because all seeds and grains get into the separator through the openings of the threshing basket. (Source: Waldenburg Catalogue 2009)

The Cimbria Delta 100-Series

Figure 28: The Cimbria delta cleaner type 101

The Cimbria Delta Super cleaners ensure excellent efficiency and purity in the cleaning all kinds of crops such as garden seeds, grass seeds, flower seeds, corn, leguminous seeds etc. It is easy to operate with it because all adjustments are placed at a suitable height and all operating handles are on the same side as the outlets. The air Lifting channel eliminates light seeds in the variable expansion chamber. Chaff, dust etc, are led with the airflow to the after suction system. The air lifting sieve screen forces the product under passage to turn its biggest surface against the air flow in order to obtain optimal separation. The air Lifting Unit is capable - by means of staggered fans and air guides – of giving a completely uniform air pressure from beneath the product when it leaves the cleaner. The finished product has a high quality because it is clearly illustrated by the difference between the cleaned seed/product and the discarded light product over the air lifting system (Source: www.cimbria.com/files/CAS_brochure_cleaner_GB.pdf

Retsch separations sieves

Figure 29: A Retsch sieve

RETSCH analytical sieve shakers are used in research and development, quality control and production monitoring. Main areas of application are Chemicals, coal, coffee, fertilizers, fillers, flour, metal powders, minerals, sand, seeds, soils, washing powder, cement clinker.The patented electromagnetic drive of the sieve shakers AS 200 control, AS 300 control and AS 450 control produces a 3-D throwing motion which ensures optimum use of the open sieve area and lets the sample move equally over the whole sieving surface. These instruments feature digital amplitude adjustment which allows for sharp fractionizing of the sample even after very short sieving times. All sieve shakers of the series “control” come with an inspection certificate and can be calibrated. (source:www.retsch.de/de/produkte/sieben/analysensiebe)

4.10.3 Seed separation by hand

Sometimes it is not possible to separate the harvested material with a cleaning machine. In this case the material will be sieved by hand in the laboratory. The sieves from the different machines are used for it. After the sieving the seed separation has to be done with hand lenses, a pair of tweezers and a binocular microscope. It depends on the size of the sample and the homogeneousness of the seed mixture how long it takes but mostly between 3-6 days.

Figure 30: Sieving by hand

Figure 31: Chaff of the seed stripper material

Figure 32: Seeds of the seed stripper material

Figure 33: seed separation in the laboratory with binocular microscope and hand lenses

Figure 34: seed separation in the laboratory with a pair tweezers

4.10.4 Germination

The germination at AREC Gumpenstein will be done with the Jacobsen apparatus. The Jacobsen apparatus mainly consists of a germination plate being temperature-conditioned by means of the water basin below. The water bath is equipped with an automatic temperature control. The germination spirals being equipped with a paper substrate which is placed on the germination plate. The wick is being led through slots in the germination plate and reaches into the water bath below, thus supplying the required humidity and the desired temperature to the paper substrate. The circular filter papers are covered with a transparent or dark cover dome to provide the air humidity being required for the germination. A small hole in the upper end of the dome ensures sufficient supply of fresh air and minimum evaporation at the same time. Units being executed with active cooling allow day-night temperature alternation, as well as any temperature profile (ISTA 2009).

Figure 35: Jacobsen apparatus

4.10.5 Storage of the harvested material

The assessment of the influence of storage to be germination rate will be done by storing threshed material and pure seed under controlled conditions of 2-5 °C and 40% humidity and under defined conditions in a freezer container. The assessment of seed germinability of the materials (threshed material and pure seed) will be done after 1 and 2 years stored under this different conditions.

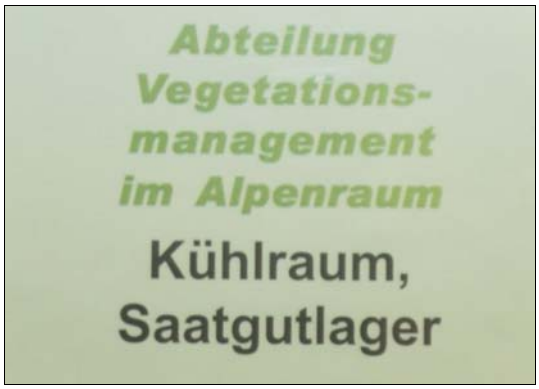


Figure 36: Entrance to our cooling chamber


Figure 37: cooling chamber of the project partner AREC

4.10.6 Results of the seed separation

The table below shows the results of the seed separation from the harvesting methods OST1 and SS. The samples were separated as described before. Sieved and afterwards with hand lenses, a pair of tweezers and a binocular microscope.

Table 9: separated harvesting sample from OST 1

species	number	[g]	[%]
Alopecurus pratensis	1	0,001	0,016
Arrhenatherum elatius	-	2,497	16,643
Avenula pubescens	59	1,163	7,751
Bromus erectus	37	0,768	7,675
Dactylis glomerata	57	0,266	1,774
Festuca pratensis	36	0,701	4,672
Poa pratensis	-	0,122	0,815
Trisetum flavescens	93	0,078	0,521
Festuca sp.	-	1,163	7,753
grasses	**283**	**6,758**	**47,619**
Anthyllis vulneraria	**23**	**0,086**	**0,864**
Medicago lupulina	3	0,004	0,042
Trifolium pratense	1	0,001	0,016
Trifolium repens	3	0,002	0,030
legumes	**30**	**0,093**	**0,952**
Achillea millefolium	11	0,001	0,024
Campanula patula	10	0,000	0,002
Cerastium arvense	16	0,001	0,009
Centaurea jacea	2	0,001	0,028
Dianthus carthusianorum	117	0,070	0,467
Galium sp.	-	1,304	8,693
Knautia arvensis	7	0,032	0,214
Myosothis	4	0,001	0,006
Plantago lanceolata	1	0,000	0,002
Salvia pratensis	119	0,126	0,843
Salvia nemorosa	49	0,013	0,089
Sanguisorba minor	3	0,013	0,131
Silene vulgaris	51	0,024	0,161
Ranunculus acris	1	0,003	0,062
Taraxacum officinale	1	0,001	0,016
Thymus praecox	8	0,001	0,003
Veronica chamaedrys	7	0,001	0,022
unbekannt	7	0,004	0,041
herbs	**414**	**1,598**	**10,813**
all seeds	**727**	**8,448**	**56,320**
chaff	**-**	**6,552**	**43,680**
whole sample [g]	**-**	**15**	**100**

Table 10: separated harvesting sample from SS

species	number	[g]	[%]
Arrhenatherum elatius	-	3,16	21,08
Avenula pubescens	132,00	0,24	1,61
Bromus erectus	8,00	0,68	6,81
Bromus inermis	21,00	0,05	0,96
Dactylis glomerata	27,00	0,22	1,49
Festuca pratensis	39,00	0,50	3,34
Poa pratensis	-	0,33	2,22
Trisetum flavescens	-	0,18	1,17
Festuca sp.	-	0,81	5,39
grasses	**227,00**	**6,17**	**44,07**
Anthyllis vulneraria	1,00	0,00	0,07
Lotus corniculatus	3,00	0,00	0,02
Medicago lupulina	3,00	0,00	0,07
Trifolium pratense	3,00	0,00	0,08
Trifolium repens	1,00	0,00	0,02
legumes	**11,00**	**0,01**	**0,25**
Achillea millefolium	2,00	0,00	0,00
Dianthus carthusianorum	81,00	0,09	0,58
Galium sp.	-	1,13	7,56
Knautia arvensis	7,00	0,02	0,14
Salvia nemorosa	20,00	0,01	0,04
Ranunculus acris	4,00	0,01	0,20
Hypericum quadrangulum	1,00	0,01	0,14
Salvia pratensis	38,00	0,04	0,25
Silene vulgaris	23,00	0,01	0,11
Veronica sp.	3,00	0,00	0,00
unbekannt	1,00	0,00	0,01
unbekannt	1,00	0,00	0,00
herbs	**181,00**	**1,31**	**9,03**
all seeds	**419,00**	**7,50**	**53,35**
chaff	**-**	**7,50**	**49,98**
whole sample [g]	**-**	**15**	**100**

5 Workpackage 6 Establishment of new High Nature Value Areas

A characterisation and a map of the experimental and the demonstration site and the activities of work packages 6 are described below. For all sites, the involvement in the different actions is indicated.
The project partner 2 (AREC Raumberg-Gumpenstein) is involved in the following actions:

Work package 6 Establishment of new High nature value Farmland

⇒ assessment of the effectiveness of different propagation material in restoring HNV areas in different types of degraded sites

⇒ demonstration of the effectiveness of different propagation material in restoring HNV areas in different types of degraded sites

⇒ convincing of stakeholders of the benefit of the methods and transfer of knowledge into practice (not part of this report)

⇒ synopsis and evaluation of information regarding the establishment of HNV areas (not part of this report)

5.1 Overview and characteristics of study sites

5.1.1 Description of the experimental and demonstration sites

Project partner	2	2+3	2
Country	Austria	Austria	Austria
Type of target community	Arrhenatherion	Arrhenatherion	Molinion
Type of degraded land	grassland	flood detention basin	fresh meadow
Type of trial	experimental	demonstration	demonstration
Involved in Action	WP4, WP5, WP6	6.2	6.2
Year of implementation	2009	2009	2007
Description of the site			
Location	experimental site GUM II-B	Stillbach (Upper Austria)	Weissenbach golf course
Natural landscape unit	Ennstal valley, on a glacial terrace	artificial invested area	Ennstal valley, on a glacial terrace
Longitude (° from Greenwich)	47° 29' 41" N	48° 14' 05" N	47°33'25" N
Latitude (°)	14° 06' 05" E	13° 43' 03" E	14°11'43" E
Altitude (m s.l.m.)	c. 740 m a.s.l.	c. 363 m a.s.l.	654 m ü. A.
Aspect (0 °= North, 90 °= East,...)	plain	plain	plain
Slope (%)	0	50	0
Extension (Approx.)	25 m x 90 m	20 m x 156 m	1 ha
Geology	northern limestone alps, east alps	Molassezone, fluvial terraces, tertiary accumulation gravel, sand, clay	northern limestone alps, Palaeozoic greywacke and crystalline schist; Werfner strata with gypsum deposits
Description of the climate			
Mean yearly rainfall (mm) 1971-2000	1014,1 mm	889,4 mm	1014,1 mm
Mean rainfall in spring, summer, autumn and winter (mm) 2007	192, 162, 344, 178	252, 166, 150, 219	242, 271, 543, 232

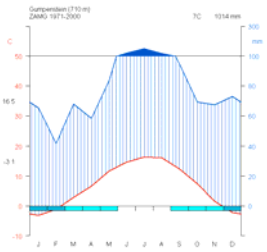
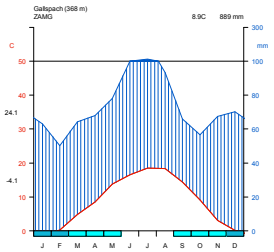
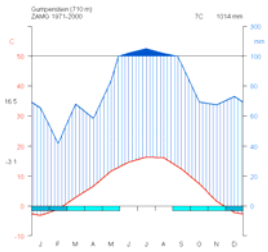
Mean yearly temperature (°C)	7°C	8,4°C	7°C
Mean date begin vegetation period (mean daily temperature 5°C for sequently fife days)	24.März	19.März	25.März
Mean date end vegetation period (mean daily temperature 5°C)	3.November	6.November	4.November
Mean length of vegetation period	307	310	308
Climate chart			
Type of soil preparation	Seed production (06/08, 08/09), “Regolen” in Mai 2009, ploughing	straw mulching with bitumen ("black-green system")	mulching, ploughing, levelling
Photographs			

Figure 38: Location of receptor site on the flood detention basin Stillbach (Upper Austria).

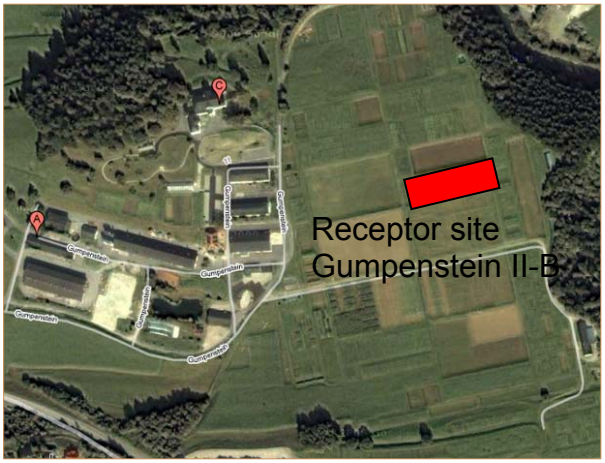


Figure 39: Location of the receptor site in Gumpenstein; Ennstal valley

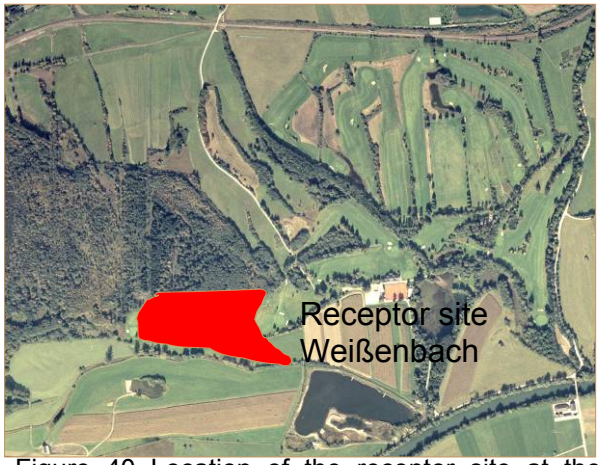


Figure 40 Location of the receptor site at the golf course Weißenbach

5.2 Design of experimental and demonstration trials

All experimental and harvesting trials are realised in block design to allow statistical analyses. The demonstration trials (only receptor site) are applied without repliccation. The experimental trial was restored in the beginning of July.

5.2.1 Design of experimental trial GUM/II-B at the AREC Raumberg-Gumpenstein

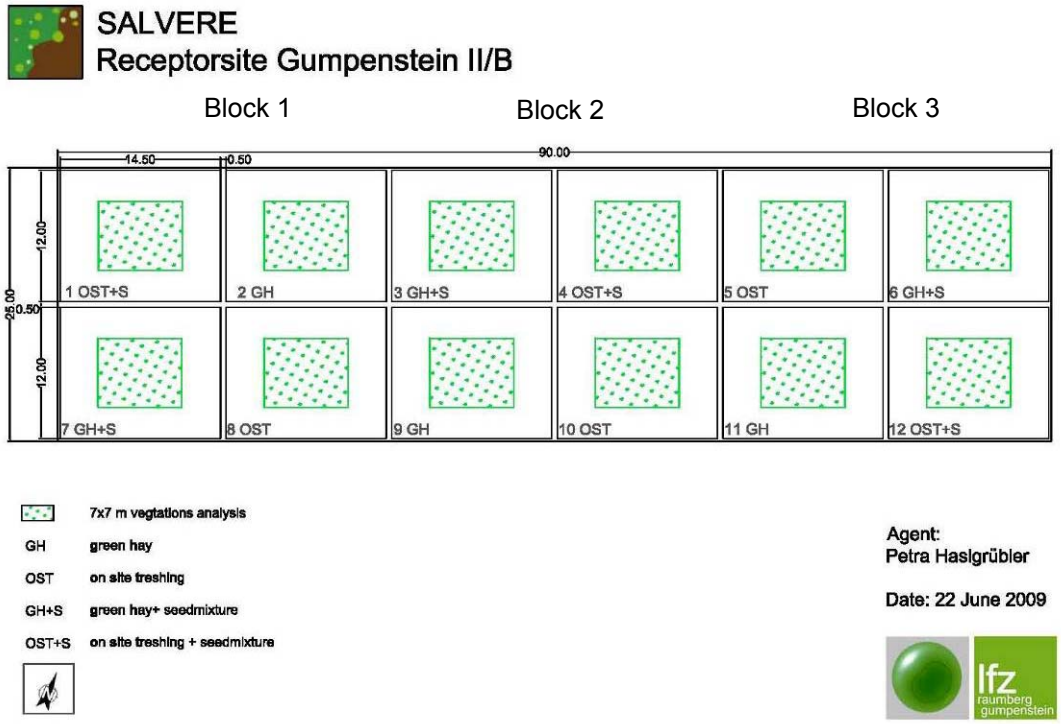


Figure 41: Map of the experimental site Gumpenstein II-B

The materials from the donor site (Arrhenatherion - grassland from the Welser Heide) are used to apply the experimental site Gumpenstein II-B. The donor site was harvested in July 2009. The green hay-variant was implemented immediately after cutting on the experimental site. The on-site threshing material was applied on the 25.08.2009.

	GH	GH+S	OST	OST+S
replicantions	3	3	3	3
Trial size [m^2]	174	174	174	174
Compulsary methods	x		x	
Voluntarily methods		x		x
seed mixture/m^2 [g]		2.5	3	1.5 + 1.5
seed density donor:receptor	1:2.6	1:2.6		
date of sawing	01.07.2009	01.07.2009	25.08.2009	25.08.2009

5.2.2 Design of demonstration trial on the flood detention basin Stillbach

Different types of soil are used for the construction of the flood detention basin. The flood detention basin was vegetated on the 16 April 2009. The area was sown via hydroseeding, consisting of a mixture of seed-rich material from on-site threshing with additional sowing of commercially propagated species from regional origin. The seed rich material from on site threshing was originated from the Welser Heide. Because of the early setup in April 2009, the material from the harvest 2008 had to be used.

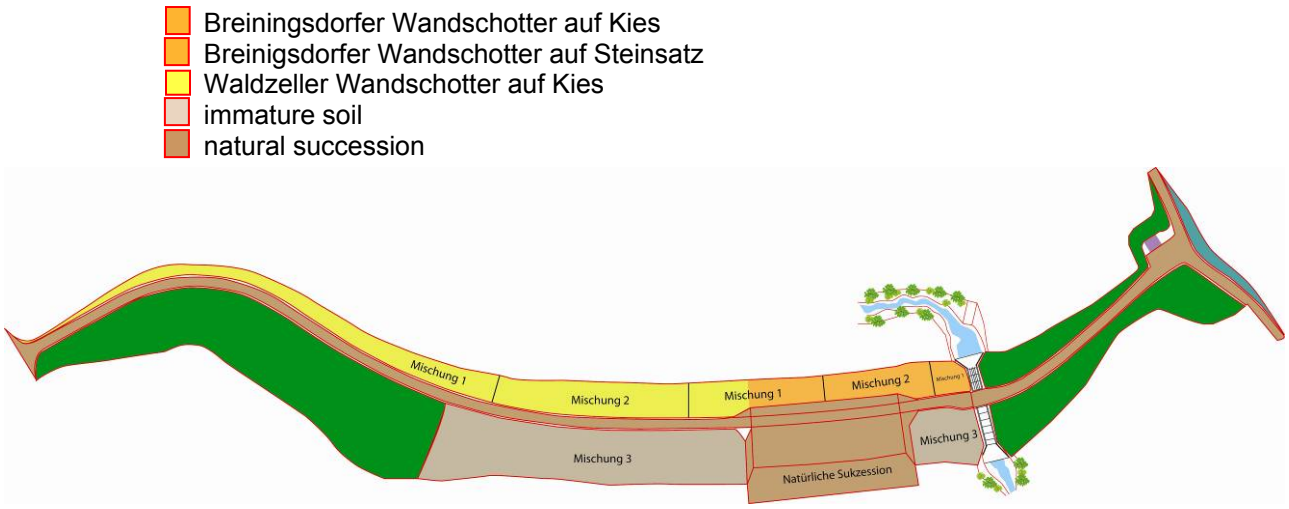


Figure 42: Map of the demonstration site Stillbach

Trial size	161 m^2
Compulsory propagation materials	OST+S
Seed density	2 -3,5 g/m^2
Date of sowing OST+S	16.04.2009

Top soil (humus or compost) was not implemented on the detention area because the percentage of the fine fraction of the different gravel types was high enough. Different samples of seed mixture are

- Sample area I semi dry grass and mixture (AV1)
- Sample area II poor grass and mixture (BM1)
- Sample area III Tall oat grass meadow (AV2)

Table 11: different types of seed samples AV1, BM1, AV2

Sample area I (AV1)	**GW-%**	**Sample area II (BM1)**	**GW-%**	**Sample area III (AV2)**	**GW-%**
Festuca nigrescens	35	*Arrhenatherum elatius*	10	*Festuca nigrescens*	17
Festuca rupicola	18	*Avenula pubescens*	8	*Arrhenatherum elatius*	15
Bromus erectus	10	*Festuca nigrescens*	6	*Avenula pubescens*	10
Briza media	2	*Lolium multifl.* var. *westerwoldicum*	5	*Bromus erectus*	20
Lolium multifl. var. *westerwoldicum*	5	*Bromus erectus*	7	*Briza media*	2
Leucanthemum vulgare	2	*Briza media*	1	*Lolium multifl.* var. *westerwoldicum*	5
Anthyllis vulneraria	3	*Leucanthemum vulgare*	8	*Leucanthemum vulgare*	2
		Anthyllis vulneraria	3	*Anthyllis vulneraria*	3
				Knautia arvensis	1
seed rich material from OST	25	seed rich material from OST	52	seed rich material from OST	25
	100		100		100

Application technique: hydro-seeding plus straw-mulch

Hydro-seeding combined with covering the topsoil with a layer of straw-mulch was used. In this seeding method seeds, fertiliser, soil adjuvant substances and gluten are mixed with water in a special spray container and sprayed over the areas to be restored. Even steep banks with a smooth surface can be restored in this way, whereby the rapid emergence of the seed has above all proved to be advantageous against erosion processes.

Table 12: material expenditure of the hydroseeding for the different types of seed samples

Sample area I(AV1)		**Sample area II (BM1)**		**Sample area III (AV2)**	
Composition per half area ca. 2500 m²		Composition per half area ca. 2500 m²		Composition for 4350 m² area	
35 kg	AV 1 = mixture 1/ semi dry turf	35 kg	BM 1 = mixture 2/ pure grassland	75 kg	AV 2 = mixture 3/ Arrenatherum meadows
50 kg	15 : 15 : 15 = Vollkorn yellow	50 kg	15 : 15 : 15 = Vollkorn yellow	100 kg	15 : 15 : 15 = Vollkorn yellow
25 kg	Recuform 38% N	25 kg	Recuform 38% N	25 kg	Recuform 38% N
400 l	Turf	400 l	Turf	500 l	Turf
15 kg	Cellugrün	15 kg	Cellugrün	30 kg	Cellugrün
1,5 kg	Proterra 2000/glue	1,5 kg	Proterra 2000/glue	2,5 kg	Proterra 2000/glue
140 kg	Provide Verde 4,4% N	140 kg	Provide Verde 4,4% N	120 kg	Provide Verde 4,4% N
500 g	Straw	500 g	Straw	500 g	Straw

5.2.3 Design of demonstration trial of Weißenbach

Site description
• 3 donor areas and receptor areas
• Inclination: plain
• Date of harvesting the donor areas: September, 5, 2006
• Date of set up the restoration areas: November 2006

Soil parameters
• pH of receptor areas: 5.9 – 6.9

Variant S1 - *Molinia caerulea* rich litter meadow
• Seed density: 2.5 g/m²
• Application technique: sown by seeder
• Monitoring plot: 1 – 4 (36m² per plot)

Variant S 2 – Litter meadow with tall sedges
• Seed density: 2.0 g/m²
• Application technique: sown by seeder
• Monitoring plot: 5 – 8 (36m² per plot)

Variant S 3 - *Iris sibirica* rich litter meadow
• Seed density: 3.5 g/m²
• Application technique: sown by seeder
• Monitoring plot: 9 (36m² per plot)

S 1 Molinia caerulea rich litter meadow
S 2 Tall sedge swamp
S 3 *Iris sibirica* rich litter meadow
Areas of natural succession
6x6m Monitoringareas

Figure 43: Location of the receptor site Weißenbach in the Ennstal valley with the 9 monitoring areas

5.3 Soil survey for all sites

The soil samples of the experimental and demonstration sites will be analysed in order to assess it physical and chemical properties and it fertility. At plot level, soil samples were collected in two layers (0-10 and 10-20 cm) and will be analysed in the laboratory.

Table 13: Parameters which are analysed from all sites

Description of the soil	Results
Gravel (%)	in progress
Sand (%)	in progress
Lime clay (%)	in progress
pH (in water/CaCl2)	in progress
Organic matter content (%)	in progress
Total Carbonate (mass-%)	in progress
Total Nitrogen (according to national rules) (mass-%)	in progress
Total Phosphorus (mass-%)	in progress
Total Potassium (mass-%)	in progress
Plant available phosphor mg per 100 g soil	in progress
Plant available magnesium mg per 100 g soil	in progress
Plant available potassium mg per 100 g soil	in progress

5.4 Methods Work package 6

5.4.1 Propagation material of the experimental site Gumpenstein II-B (see figure 4)

Compulsory propagation materials

OST sowing of seed-rich material from on-site threshing (3 g/m²) from the first cut in summer

GH application of approx. 1.5 kg (3 – 5 cm) freshly mown plant material in a ratio of 1:2.6 donor:restoration area ("green hay") from the first cut in summer

Voluntary propagation materials

OST + S sowing of seed-rich material from on-site threshing 1.5 g/m² with additional sowing of commercially produced species; seed of regional origin from seed propagation with 1.5 g/m^2

GH + S Application material is approximately 1.5 kg freshly mown plant material in a ratio of 1:2.6 donor:restoration area ("green hay + seed mixture") with an additional seed mixture of commercially produced species. Seed material is used of regional origin with seed propagation of 2.5 g/$m^{2.}$

5.4.2 Specifications for harvesting and implementation

Date of harvesting

- The donor site was harvested on the 1st of July. All methods were cut at the same time to allow a comparison between different methods.

Date of implementation

- green hay (GH): application of the material on the receptor trials was implemented immediately after cutting at the harvesting date
- on-site threshing material (OST): application of the material on receptor trials was on the 25.08.2009, following the right weather conditions.

Management after restoration

In the year of application the Green hay variants were cut after two moths on the 16.09.2009 to control unwanted weeds. The OST and OST+S did not need a cut because of the late set up. In the following years, the area will be cut at least oonce, depending on the usual management of the specific community.

Figure 44: Three pictures from the implementation in July 2009 until now (4 month later, November 2009) where the GH and the GH+S is covered with snow.

Demonstration of the effectiveness of different propagation material in restoring HNV areas in different types of degraded sites

5.4.3 Flood detention basin Stillbach

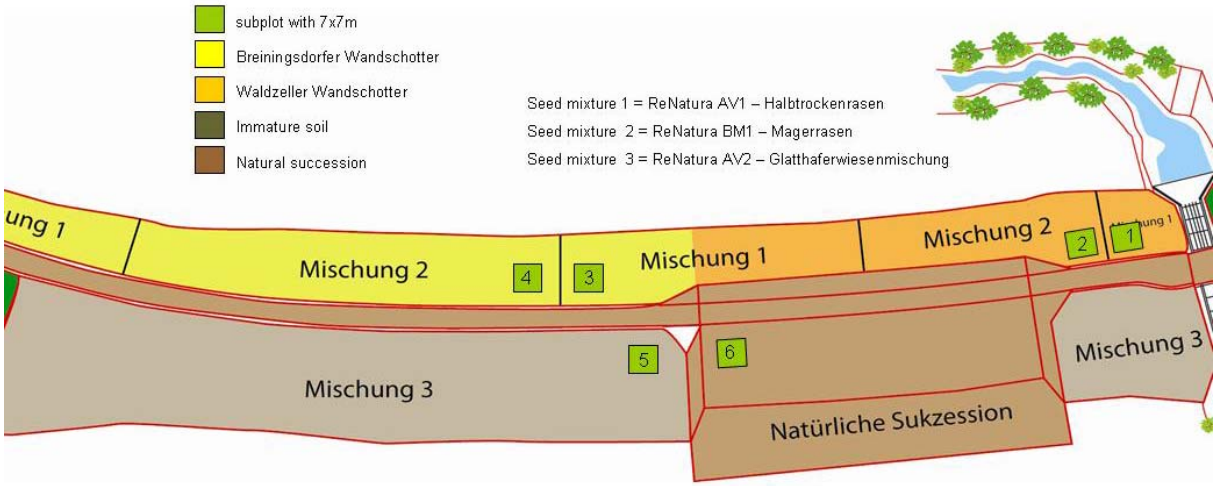


Figure 45: Different types of soil/gravel are used for the construction of the flood detention basin

OST + S sowing of seed-rich material from on-site threshing 3.5 g/m² with additional sowing of commercially produced species; seeds of regional origin from seed propagation with 2.5 g/m²

☐ subplot with 7 m x 7m

5.4.4 Specifications for harvesting and implementation

Date of harvesting
- The donor site (Welser Heide) was harvested in 2008.

Date of implementation
- on-site threshing material: application of material on receptor trials was on the 16 April 2009 with hydro seeding

Management after restoration
This year a cut was not necessary because of the different gravel variants and the extensive seed mixtures AV1, AV2 and BM1. The percentage of unwanted vegetation was very low using a cover crop *Lolium multiflorum*. This grass species is annual and will be gone by next year. In the years after set up the area will be cut at least once depending to the usual management of the community.

Figure 46: Three pictures from the implementation till the greened dam.

Golf course Weißenbach

The demonstration site at Weißenbach was set up on the 30 Nov. 2006. The reason for the late restoration in the winter was because *Iris sibirica* needs frost to germinate. After the implementation with on-site threshed material of the site a cleaning cut in June 2007 was necessary to control the unwanted weeds. 9 Monitoring plots with a size of 6x6 m were implemented to do vegetation analysis. This year the vegetation analysis was done in July.

OST sowing of seed-rich material from on-site threshing (ca. 3.5 g/m^2) from the first cut in summer

5.5 First Results of the vegetations analysis

5.5.1 Experimental site Gumpenstein

As already mentioned the first vegetation analysis of GH and GH+S on the experimental trial in Gumpenstein was done on 16.09.2009. A species list was created and the percentage of grasses, herbs and legumes were estimated. The following figure will show the first results of the year 2009.
The proportion of grasses is higher than that of herbs and legumes. With one exception on the field 6 GH+S the percentage of the grasses is lower. It is evident that the average of herbs and legumes on the variants with the seed mixture is higher than on the other ones. The green hay was very seed rich with herbs and legumes but through the thick mulch layer the grasses had a big advantage to develop instead of the herbs and the legumes.

Figure 47: Vegetations analysis in Gumpenstein on 16.09.2009

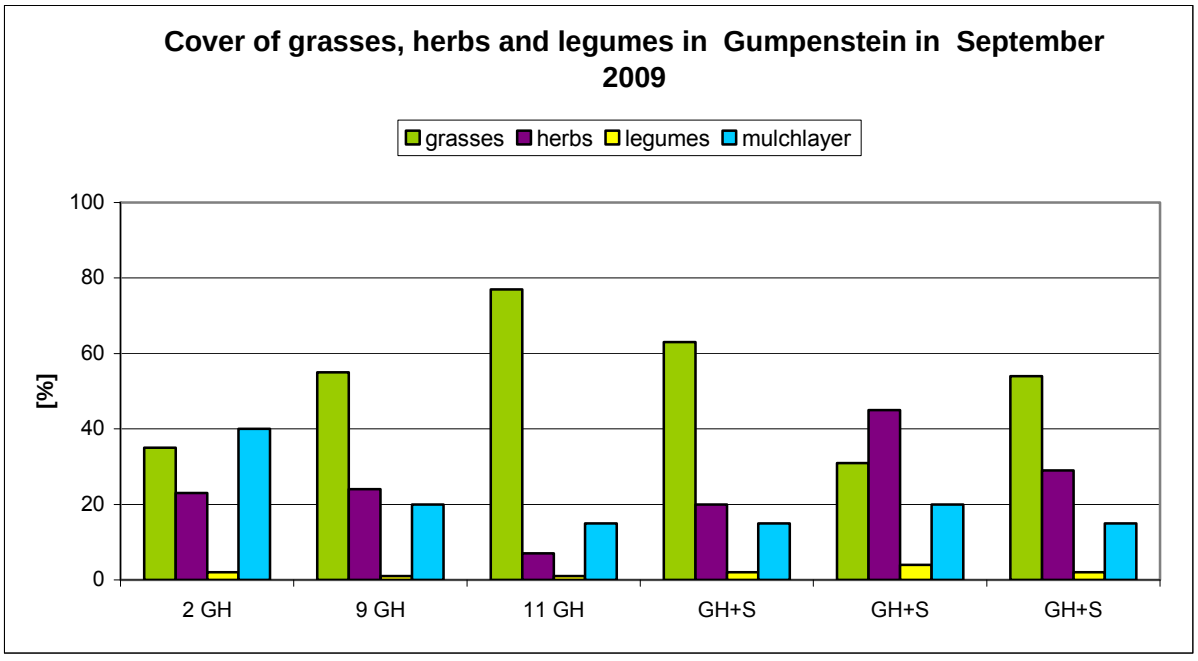


Figure 48: Cover of the green hay variants on the experimental site in Gumpenstein from the vegetation analysis in September 2009

5.5.2 Demonstration site the flood detention basin in Stillbach

The flood detention basin was set up in April 2009.Three different seed mixtures and two gravel mixtures were used. The first vegetation analysis was done in October 2009. Showing only marginal vegetation just a species list was made. An exact botanical survey will be done next year. Surprisingly no cleaning cut was necessary. Through the gravel mixtures and the extensive seed mixture the amount of the biomass was very low, also no unwanted weeds were found. If it is necessary, a cultivation concept will be worked out next year.

Figure 49: Three different views on the flood detention basin in Stillbach. The first view is on immature soil with the seed mixture ReNatura AV2. The second view is on top of the dam where lanes from cars and vegetation are visible. The third view is on Breiningsdorfer and Waldzeller gravel with different seed mixtures AV1 and BM 1

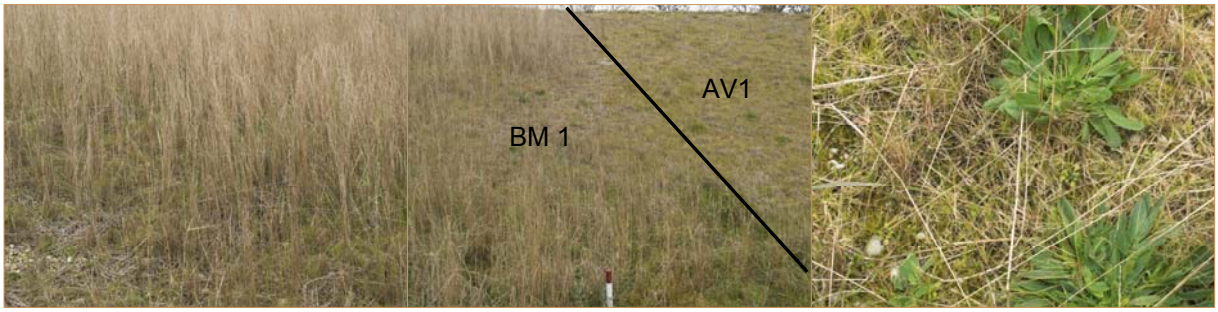
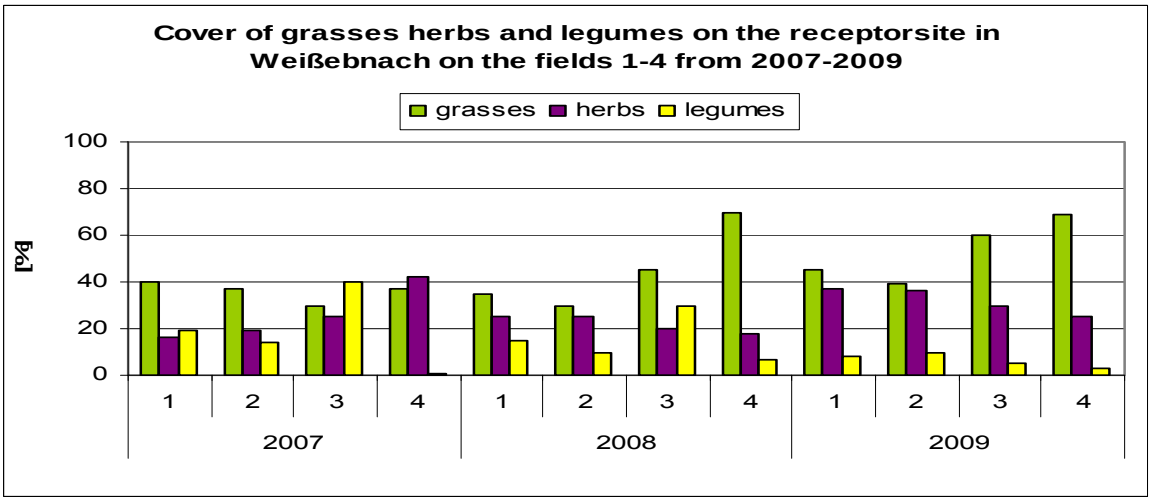


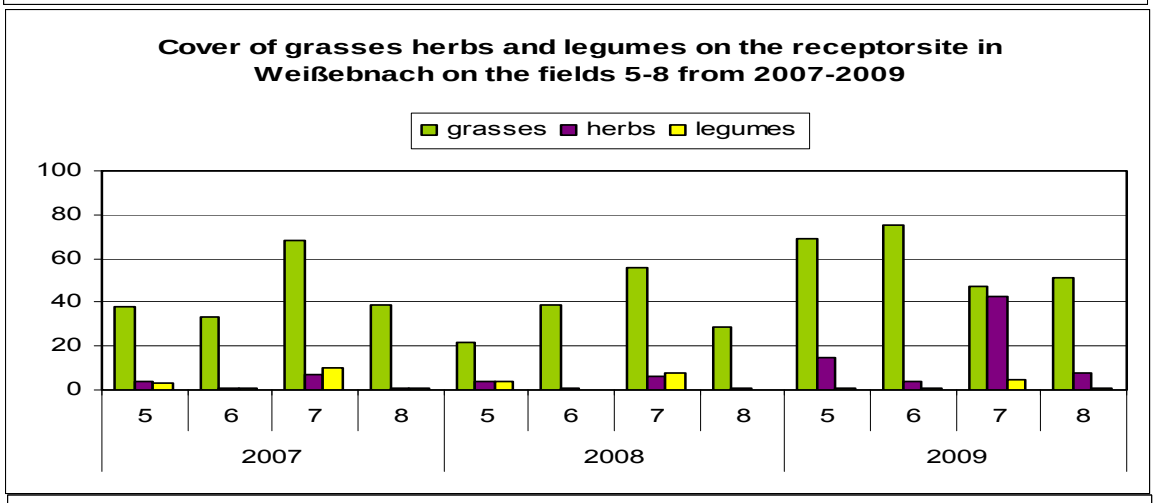
Figure 50: Details of the vegetation on the flood detention basin. First is the cover crop *Lolium multiflorum* in the middle is the difference between two seed mixtures BM1 and AV1 and on the right site is a detail of *Anthyllis vulernaria*

5.5.3 Demonstration site Weißenbach

The Demonstrations site was set up 2006. The first vegetation analysis was done 2007. Every year a vegetation survey and a species list will be created. Figure 15 shows a comparison of the seed mixture from a *Molinia caerulea* rich meadow on the fields 1-4. It is obvious that the legumes have a decline in comparison to the other two years. The percentage of grasses and herbs is rising.
The fields 5 - 8 are a tall sedge swamp. The portion of herbs is almost doubling in comparison to the other years. The fraction of grasses is rising in the field 5, 6 and 8. The fraction of herbs and grasses on field 7 are almost the same. This is because of the underground, the other fields are flooded. The cut of the legumes is deteriorating.

The field number 9 is an *Iris sibirica* rich meadow. The coverage of the whole vegetation rises slowly, as those kinds of meadows are growing slowly.





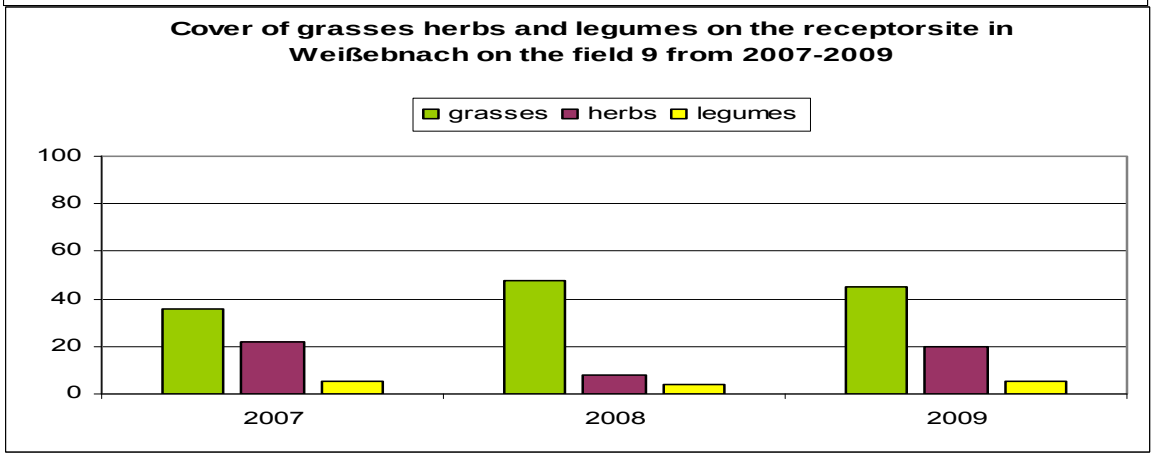


Figure 51 - 52: The three figures show the development of the coverage of grasses, herbs and legumes of the receptor site in Weißenbach in a time laps from 2007 to 2009.

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7 Annex
Questionnaire on High Nature Value Farmland (HNVF)

Please answer the questions at a national, regional and provincial level if a differentiation is possible and useful!

1) Who in your country/region/province is responsible for aspects of HNVF?

please indicate name, institution, contact address (e-mail) and field of responsibility:

☐ definition of HNVF
☐ census of HNVF
☐ HNVF data base
☐ HNVF mapping

2) Is there a national definition of HNVF existing? ☐ yes ☐ no

if yes, please give some details on it
if no, how long will it take?

3) Has HNVF already been identified in your country/region/province?

☐ yes ☐ no

if yes, are maps ☐ and/or data ☐ available ☐ yes ☐ no

size of HNVF in your country: _____ ha
size of agricultural used area: _____ ha

4) What are the main farmland types within HNVF in your country/region/province?

5) Proportion of HNVF in Nature 2000 areas in your country/region/province

☐ very high (> 90%)
☐ high (50-90%)
☐ low (10-50%)
☐ marginal (<10%)

6) What is your opinion about the level of information of different stakeholders on HNVF in your country/region/province? (1 = excellent, 2 = good, 3 = poor, 4 = bad)

agriculture ☐
nature conservation ☐
society ☐
policy ☐

7) What about the attitude of different stakeholders towards HNVF in your country/region/province?
(1 = very important, 2 = relevant, 3 = less important, 4 = unimportant)

agriculture ☐
nature conservation ☐
society ☐
policy ☐

8) Is there an agri-environmental programme existing in your country/region/province?
☐ yes ☐ no

(please provide a link to the scheme if available)

if yes, does it impact HNVF? ☐ yes ☐ no

are there special measures to improve HNVF? ☐ yes ☐ no

if yes, please state and describe the measure(s):

9) If there are not any measures to improve HNVF already existing, are they in progress?

☐ yes ☐ no

if yes, please describe them

10) If HNVF-areas have already been identified in your country/region/province, what are these areas used as/for?

	major	occasionally	rarely	never
agricultural use	☐	☐	☐	☐
-meadows	☐	☐	☐	☐
-pasture	☐	☐	☐	☐
-other ☐ (please describe)	☐	☐	☐	☐
nature conservation				
- protected areas	☐	☐	☐	☐
-recreation areas	☐	☐	☐	☐
-other ☐ (please describe)	☐	☐	☐	☐
- donor sites for seeds or plant material	☐	☐	☐	☐

11) Is there any intention to establish new HNVF-areas?

if yes, who is the driving force?

are there any activities so far (research, demonstration areas ..)?