LIFE Project Number

LIFE 00 ENV/EE/000924

THE LAYMANS`S REPORT

Covering the project activities from 01.01.2002 to 31.12.2005

LIFE PROJECT NAME

Sustainable wastewater purification in Estonian small municipalities

Data Project

Project location	Estonia
Project start date:	01/01/2002
Project end date:	31/12/2005
Total Project duration (in months)	48 months
Total budget	€ 711268
EC contribution:	€ 325334
(%) of total costs	45.74%
(%) of eligible costs	50.00%

Data Beneficiary

Name Beneficiary	Estonian Agricultural University
Contact person	Dr. Katrin Heinsoo
Postal address	Kreutzwaldi 64, Tartu, Estonia, 51014
Visit address	Riia 181, Tartu, Estonia
Telephone	00-372-7 477172
Fax:	00-372-7-383013
E-mail	katrin@zbi.ee
Website	http://www.eau.ee/

List of Contents

1. Initial situation prior to the project

After the era of Soviet Union most of wastewater purification systems in Estonian small municipalities were left without care and their purification efficiency decreased so that majority of these did not work effectively if at all. Nitrogen and phosphorus discharged this way to nature are pollutants in lakes and rivers being a serious environmental problem not only in Estonia but also in neighbouring countries. Simultaneously decreased the life standard and income of remaining local inhabitants as the collective farms collapsed and a lot of people had to move to find a job at larger centres. The legislation concerning pollutant levels in wastewater discharged to nature was updated from year to year to meet the standards of EU. The above-mentioned factors caused the situation of local small municipalities facing the fact of having obligation to reduce the level of pollutants in wastewater but being unable to reconstruct expensive-to-run conventional wastewater purification plants because of the lack of budget. This initiated the search for cheaper and sustainable wastewater purification methods. Instead of conventional chemical purification the method of more space demanding vegetation filters to purify the wastewater could be used in locations where abandoned agricultural land was available for this purpose.

The project manager from Estonian Agricultural University (EAU), Dr. Katrin Heinsoo, had studied the methods of sustainable wastewater purification methods in vegetation filters at Swedish Agricultural University. Moreover, in Sweden there are also excellent examples of vegetation filters of large scale (for example in Enköping more than 75 ha of vegetation filter). So we had knowledge about applicability of those methods in our climatic conditions and initiative from local municipalities to create our own prototypes of wastewater purification systems based on vegetation filters that could be transferred to other regions of Baltic States if the first results would be promising.

2. The aims and the results of project

The project incorporated two partners (Kadrina and Kambja municipality) and beneficiary (EAU). The main objectives of this 48-months project were:

- To establish 3 different wastewater purification system (WWPS) prototypes to two Estonian rural communities;
- To present the innovative sustainable wastewater purification system as a way for solving local environmental/energy supply problems in Estonia

To achieve the aims one WWPS had to be established at both, Vohnja and Kihlevere villages of Kadrina municipality, northern Estonia and the third in Kambja, southern Estonia. (Fig.1).

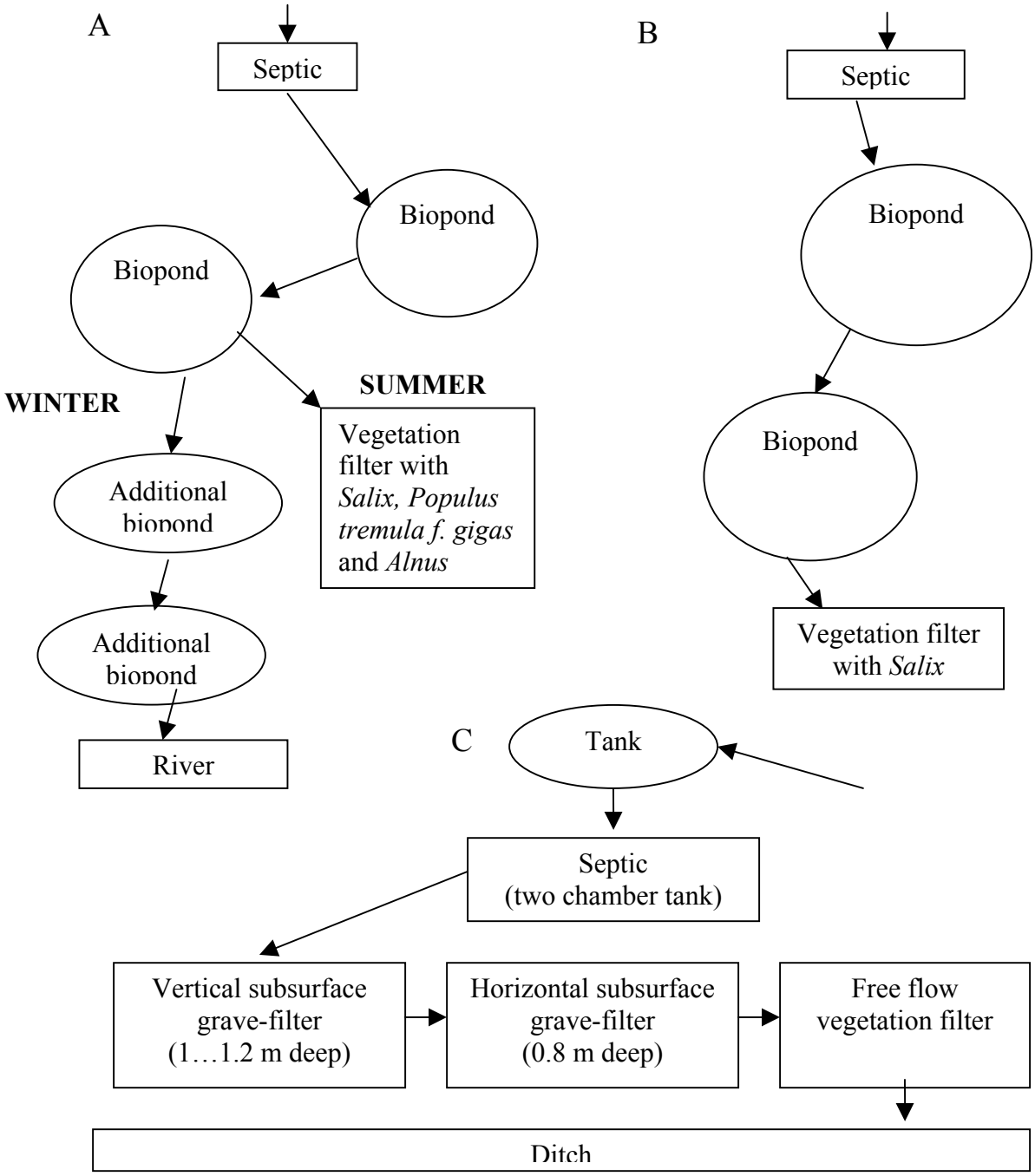

Figure 1. Illustrative schemes of prototypes: A – Kambja, B – Vohnja, C – Kihlevere.

During the second half of the project the established prototypes were working with full capacity. Hence, we achieved the aim of supplying Estonia rural areas involved with sustainable and inexpensive-to-run prototypes for the local environment protection. In our proposal we planned to achieve wastewater quality in the prototype outflow to meet the limits stipulated in Estonian legislation from 1999 – 15 mg N and 2 mg P per litre. During 2004/2005, the average values of water samples from the vegetation filters affirmed that this aim was met at Kambja (7.5 and 0.7 mg N and P per litre) and at Vohnja (8.0 and 0.9 mg N and P per litre). Due to the shortage of water in our third prototype site the same monitoring procedure could not be achieved since the outflow to local natural water-body remained dry (see also Table 1 for the results of pre-treatment plants efficiency).

Table 1. The mean values of prototypes' purification efficiency in 2003-2005. The sampling points after mechanical treatment at Kambja and Vohnja were the outflows of the first and second biopond and in lysimeters of vegetation filter. In Kihlevere the 2nd and 3rd sampling point was the outflow of vertical subsurface grave-filter and horisontal subsurface grave-filter, respectively.

Place	Indicator	Value after mechanical treatment	Value after 2. treatment	Value after 3. treatment	Value in lysimeter
Kambja	BOD7	63,86	28,02	21,58	
	Total N	25,12	18,86	16,52	7,5
	Total P	3,42	3,17	2,69	0,7
Kihlevere	BOD7	233,48	175,74	25,92	
	Total N	76,67	69,00	45,81	
	Total P	11,26	14,13	4,85	
Vohnja	BOD7	844,44	60,06	19,81	
	Total N	95,50	30,19	11,93	8
	Total P	16,39	6,08	1,62	0,9

For vegetation filter establishment we used cuttings (ca 30 cm) of short rotation trees that have high production in our weather conditions (mainly willows *Salix viminalis* and *S. dasyclados* clones). With this action we also promoted the biomass production for renewable energy purposes in Estonia. This is important to meet the needs of EU targets also to increase the renewable energy usage substantially during the next

decade. Vegetation filters at Vohnja and Kambja were established by planting machine

During the project we also disseminated the project methods and results at different levels and worked actively in order to ensure the continuity of the project activities and objectives after the end of the current project. The dissemination activities included several presentations of project aims and results both in Estonia and aboard. We organised also the field tours to the prototypes and workshops for several groups of interest. The project prototypes were used for scientific studies and teaching of students. The leaflet introducing project technical details was published.

3. Project's cost

In order to achieve the objectives, to establish functioning prototypes, to run the project smoothly, to monitor the efficiency and to disseminate the results in local and international level we had to spent ca 618 000 Euros during the whole project (Table 2). The majority of finances were spent to establish the prototypes. We had some difficulties with external assistance costs as the Estonian legislation changed after submitting the proposal so were obligated to carry out state procurement process to find the best building company. Because of that we had to increase the volume of external assistance buying service instead of paying salaries as personnel cost directly.

Table 2. Project budget summary.

Categories of expenditure		Total amount without VAT €		Total amount with non-recoverable VAT €	
1.	Personnel	202 124,88		202 124,88	
2.	Travel	41 223,97		40 514,89	
3.	External assistance	81 078,23		94 798,15	
4.	Durable goods:	Real cost	Eligible cost	Real cost	Eligible cost
	Infrastructure	31 443,32	7 860,85	37 100,18	9 275,04
	Equipment	56 618,69	28 309,42	66 747,40	33 373,78
	Prototype	111 679,41		130 418,08	
	Sub-total	199 741,42	147 849,68	234 265,66	173 066,90
5.	Land/rights purchase/lease				
6.	Consumable material	17 495,20		19 277,07	
7.	Other costs	9 497,27		9 796,38	
8.	Overheads	16 414,28		17 744,68	
		Real cost	Eligible cost	Real cost	Eligible cost
TOTAL		567 575,25	515 683,51	618 521,71	557 322,95

The very important issue was to find own financing sources for both beneficiary and partners. The main problem concerning this topic was the lack of partners' experiences on fundraising. With effective co-operation between project team members we overcame these problems. Finally we had 5 different bankrollers to cover the necessary own financial contribution of all participants during the project. The biggest contribution to partners came from Estonian Centre for Environmental Investments. The main bankroller for EAU was the Enterprise Estonia foundation.

4. Analyse of lessons learned

Such partly and stepwise-financed project was the first experience for the beneficiary and both of the project partners. Therefore serious work of participants in the early stage of the project in order to improve their knowledge about the project management methods and network formulation was needed. This task was particularly difficult for project partners, as all the original documentation (project proposal, agreement, SAP etc) was available in English at the beginning. Therefore large efforts were made by the beneficiary to translate all the necessary materials to the partners during the first stage of the project.

The most serious issue was the bookkeeping system arrangement. As in LIFE projects the beneficiary is responsible for all funding usage also by the partners, a special system for bookkeeping documents management was needed, which raised the workload of accountants above the level predicted in proposal. Therefore the strong suggestion of the project team to the colleagues proposing for such financial support is to pay much more attention and to plan much larger financial resources in the budget for bookkeeping.

The other suggestion of the project team is to create a local, regional or general "round-table" for the representatives of such projects. This would be extremely important especially during the first stage of the project to avoid possible smaller mistakes of project management that are difficult to correct later on and to support each other. This kind of co-operation would probably improve the quality of each project.

Very important is to disseminate the results of project constantly. It gives opportunities for all stakeholders and interesting parties to learn and develop. This is also useful to ensure the durability of project methods and results after the end of current project and to create useful contacts for planning next analogous projects after LIFE project. EAU have joined three international projects initiated considering the results of current LIFE project. Our knowledge and experience was also used in order to initiate the Estonian State Program for the Usage of Renewable Sources of Energy and for establishment of the Centre of Renewable Energy at EAU.

From technical point of view we experienced that very important is the selection and preparation of land before vegetation filter planting. Previously cultivated land should be preferred or if not possible, intensive weed control measures should be carried out during at least one year before planting to deplete the seed bank of herbaceous weeds. Otherwise large effort is needed after plantation establishment to keep the plantation weedless to promote the survival and growth of plants during the first vegetation periods.

The final conclusion is that all the main objectives of this LIFE Environment project were achieved during the project period despite of various minor problems. The pre-purification step in passive bioponds was more efficient than predicted and the vegetation filters did not cause any pollution of the groundwater. The analysed study results reveal that with some corrections in the current project methods (concerning the dimension of vegetation filter area, weed control and mechanical purification layout) the similar method for sustainable wastewater purification in settlements with up to 1000 residents can be used.