



LIFE Project Number

LIFE10 ENV/SK/086

Progress Report No. 3

Covering the project activities from 11/10/2014 to 10/11/2015

Reporting Date

15/11/2015

**The impact of geological environment on health status of residents of the
Slovak Republic**

Acronym **Geohealth**

Data Project

Project location	Slovak Republic (whole territory)
Project start date:	01/09/2011
Project end date:	31/08/2015 Extension date: 31/08/2016
Total budget	418,112 €
EC contribution:	207,273 €
(%) of eligible costs	49.57

Data Beneficiary

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Notes:

According to the Common Provisions Article 12 – Technical activity reports, the coordinating beneficiary must provide the Commission with:

- progress reports with the delay between consecutive reports which does not exceed 18 months;

The progress report shall contain the necessary information for the Commission to evaluate the state of implementation of the project, the respect of the work plan, the financial situation of the project and whether the project's objectives have been achieved or are still achievable.

Identical copies of any progress report, in both paper and electronic versions, shall be simultaneously forwarded to the Commission and to the external monitoring team designated by the Commission, both of them receiving one complete copy of the technical reports, including annexes.

- Progress reports *must* be submitted following the timetable *as foreseen in the final version of the proposal attached to the Grant Agreement*, unless modified with agreement of the Commission.
- A progress report would normally contain approximately 10 pages (maximum 20), excluding annexes. Please use font Times New Roman 12 or equivalent.
- The technical part should contain a concise statement of the tasks undertaken and a forecast for the next reporting period. Any problems encountered during the period and possible deviations from project plans must be covered.
- Progress reports can be accompanied by annexes such as specific technical reports on issues relating to the project or reports and dissemination deliverables or other outputs from the project.
- Progress reports should be submitted in paper and electronic form.

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2. List of key-words and abbreviations

MŽP SR – Ministry of the Environment of the Slovak Republic

RÚVZ – Regional Office of Public Health

SEGH – Society for Environmental Geochemistry and Health

ŠGÚDŠ – State Geological Institute of Dionýz Štúr

WHO – World Health Organization

SR – Slovak Republic

CVD – Cardio-vascular diseases

OD – Oncological diseases

ANN – Artificial neural network

EI – Environmental indicators

HI – health indicators

CP – Common Provisions

EC – European Commission

3. Executive summary

3.1. General progress

Project is generally governed in accordance with the project schedule and in terms of Common Provisions and rules of LIFE+ programme. Within four years of project implementation, valuable results were achieved with potential value not only for the whole territory of the Slovak Republic but they can also contribute to the improvement of health state of the entire EU population. We compiled all data necessary to meet project objectives. In the last year of project implementation, we will focus on final interpretation of project results and their dissemination.

The elaboration of environmental indicators resulted in confirmation of assumption that health state of residents of the Slovak Republic is significantly influenced by geological structure of the territory. The variability of geological structure, it means various geochemical background, has marked response in health state of residents of SR. The most favourable for humans health are the carbonatic geological environments (including flysh sediments, limestone and dolomites) while the most unfavourable are silicate geological environments (volcanics, granites, crystalline shales). The main related association is between contents of Ca and Mg (or water hardness) in groundwater / drinking water. Ca and Mg deficit contents in silicate geological environments are responsible for the increased incidence or mortality for cardiovascular diseases (CVD) and oncological diseases that both represent the most common cause of death in the Slovak Republic (about 75%).

In accordance with the project schedule following 5 technical actions (**A1, A2, A3, A4, A6**) were finalized and the results are available on the project website (www.geology.sk/geohealth/). Action **A5** is very near the end of implementation.

Due to two-year delay of public tender within action **A4** (Linking of environmental and health indicators) we have not finalized yet elaboration and interpretation of results of calculations of ANN in case of soils and results of fuzzy cluster analysis.

All further actions including accompanying and disseminations works (**B1 to C6**) are continuously implemented. They are described in more details in technical part of this progress report. We thoroughly respect the principle of publishing actual results and information on implemented actions (technical, dissemination) on the website of the project (www.geology.sk/geohealth/).

3.2 Assessment as to whether the project objectives and work plan are still viable.

The project's objectives are fully valid and achievable. All activities planned within the project are implemented according to the project timetable. There is no need of modification of project financing.

3.3 Problems encountered.

During this year 2015 we have serious problem with dissemination of project results. The director of ŠGÚDŠ as coordinating beneficiary did not give approval to project team members to participate and disseminate the results on international conferences. In addition we were not given approval for visit of WHO centre in Bonn, Germany where we planned to disseminate our results in medical community.

4. Administrative part

Project is managed from the very beginning in accordance with the rules of LIFE+ programme. Every two months consultative meetings participated by members of project team are organized. Consultative meetings deal with the evaluation of project progress and planning further tasks to be solved during next period. The records from consultative meetings are available on the website of the project. The three sessions of *Steering committee* were also organized according to the planned project schedule. The fourth meeting of Steering committee is planned in December 2015. The conclusions and recommendations of the Steering committee are also available at the project website. In addition, monitoring report for the project is once a year compiled by project manager and it is also available at the project website. Project team works in the following structure:

NAME	POSITION
doc. RNDr. Stanislav RAPANT, DrSc.	project manager, scientific coordinator
Mgr. Helena ČÁRSKA	financial manager
Mgr. Veronika CVEČKOVÁ	coordinator for geology, coordinator for elaboration of proposal of measures
Mgr. Katarína FAJČÍKOVÁ, PhD.	coordinator for linking of environmental and health indicators, coordinator for environmental analysis
RNDr. Ladislav MARTINSKÝ	coordinator for dissemination activity
Ing. Kristína LACENOVÁ	coordinator for website
Jana BUDÍNOVÁ	accountant
MUDr. Zuzana DIETZOVÁ	coordinator for health
MUDr. Darina SEDLÁKOVÁ, MPH	epidemiologist

The changes in the project staff were made only for the position of financial manager. Since 01.08.2014 the position of the financial manager is executed by Mrs. Mgr. Čárska as new employee of ŠGÚDŠ.

In accordance with the planned project schedule we have elaborated following reports so far: Inception report (15.12.2011), Progress report No. 1 (10.10.2012), Mid-term report (10.08.2013) and Progress report No. 2 (10.10.2014).

We have carefully considered all the recommendations communicated by the EC (EC letter dated 16.03.2015 on Progress report No. 2 and monitoring visit letter dated 7.07.2015). Regarding the technical issues, we accept all the EC recommendations and suggestions and we will include them in the future project outputs. Regarding the financial issues, these are answered in the Annex7a of this report.

5. Technical part

All actions are still implemented in accordance with project schedule and planned timetable.

5.1.Actions

5.1.1 Action A1 – Compilation of data set of environmental indicators

This action was finished. The results and outputs of this action were presented in the Progress report No. 1 and in the Mid-term report.

5.1.2 Action A2 – Compilation of data set of health indicators

This action was finished. The results and outputs of this action were presented in the Progress report No. 1 and in the Mid-term report.

5.1.3 Action A3 – Elaboration of environmental and health indicators

This action was finished. The results and outputs of this action were presented in the Mid-term report.

5.1.4 Action A4 – Linking of environmental and health indicators

Due to two year delay of public tender, works on this action began 10.07.2014. All calculations made within this action were finished by 30.09.2015. Within this action we linked data on environmental and health indicators through method of neural networks (ANN) and fuzzy cluster analysis. We were able to delineate areas with worse health status of Slovak population.

Calculations through ANN were realized for optimized dataset of health indicators (including 43 health indicators) and optimized dataset of environmental indicators (including 32 EI for groundwater and 28 EI for soils). Calculations were made for the whole geological environment as a whole and for 8 partial geological environments (Crystalline, Paleozoic, Volcanics, Quarternary, Neogene sediments, carbonatic Mesozoic rocks, carbonatic-silicate Mesozoic rocks, Flysch Paleogene). The same calculations were made also for selected contaminated and non-contaminated areas within the territory of the Slovak Republic. These calculations are of very big amount, millions of individual calculations and thousands of outputs were obtained so far. The most significant outputs of these calculations are published on the project website, session “results – partial results”.

Within fuzzy cluster analysis, the calculations were performed for all health indicators together as well as for group of health indicators related to oncological, cardiovascular diseases, diseases of gastrointestinal tract, respiratory system and demographic indicators. These results are now elaborated and interpreted within the action A5 – Environmental analysis. This action was finished.

5.1.5 Action A5 – Environmental analysis

Within this action, geochemical and health data are elaborated for environmental-health regionalization of the Slovak Republic. The quality level of the environment and health state of residents for each municipality of the Slovak Republic are assessed. Short report entitled “The evaluation of impact of geological environment on health status of residents of the Slovak Republic“ was compiled in accordance with project schedule on 17.07.2013 as one of the project deliverables (see table of completed deliverables) and it was published on the website of the project. It was also attached in Annexes of the Mid-term report (in its Annex 6.1.1). This short report is included as output indicator within the main project deliverables “Others – short report”. Following short reports were published within years 2014-2015:

- “Contaminated sites and their impact on health status of residents” was compiled (dated to 27.01.2014),
- “Elaboration of limit values for environmental indicators” (dated to 22.09.2015),

- “Chemical composition of groundwater and relative mortality for oncological diseases” (dated to 30.10.2015, attached as Annex 7.1.1).

All short reports are published on the project website, session results-partial results.

Within this action, we are solving three main technical scientific tasks, key tasks for the whole project, based on the results of the neural network calculations. These tasks represent also project deliverables:

1. Limit values for environmental indicators. At present, we elaborate these limit values for groundwater. Limit values for soils will be compiled by the end of this year (2015).

2. Environmental-health regionalization of the Slovak Republic. This part of action was finished on 30.08.2015. Environmental-health regionalization of the Slovak Republic was based on 5 degree scale characterizing quality of the environment in relation to human health: very good, good, average, impaired and unfavourable. The environmental part was based on comparison of levels of environmental indicators for groundwater and soils with respective Slovak guidelines and the exceedance of these values were considered and evaluated for each Slovak municipality. In the health regionalization, the health indicators were compared to Slovak average values at level of Slovak municipalities and classified accordingly to rate of exceedance.

3. Delineation and characteristic of areas with unfavourable health status. This part of action A5 is planned to be realized in December 2015 – March 2016. We have already elaborated mathematical-statistical datasets (finished on 30.09.2015). We need several months for final interpretation of the achieved results. We definitely will meet the deadline for this part of action (30.03.2016) as mentioned within the Progress report No. 2.

This action is in phase of high progress and we suppose to finish it up by 30.03.2016.

5.1.6 Action A6 – Elaboration of the proposal of measures

This action consists of elaboration of summarizing factsheets of proposal of measures to reduce or eliminate negative impact of geological environment on health state of residents in SR. The factsheet presents summarizing information for each of evaluated environmental indicators from the point of view of:

- Toxic effects on human organism (due to excess or deficit) and minimal risk levels,
- Concentration levels in geological environment of the Slovak Republic (groundwater and soils) and the source of their origin (natural / anthropogenic sources).

The factsheets have the form of small brochures (double side A4 form) that provide all above mentioned information on each environmental indicator in summary way easy to understand and easy to be distributed to public. This action is completed and was published on the project website (19.10.2015).

This action is finished.

5.1.7 Action A7 – Realization of measures

These actions are to be implemented later on in accordance with new (prolonged) project timetable. One output indicator is associated with this action considered as one of the main project deliverables “Guidelines – legislative proposal”. Because of delay in action A4 we have proposed new deadline for the associated deliverable “Proposal of list of environmental and health indicators and limit values of environmental indicators for implementation into Slovak legislatures, tables, factsheet” from 30.04.2015 to 29.02.2016 (see attached table of new dates for deliverables in Annex of this Progress report No. 2).

This action has two basic levels:

1. Edification and environmental-health education of population,
2. Elaboration of proposals of legislative measures.

1. Within edification and environmental-health education of population organization of 10 informative meetings for residents was planned by the project. Due to 2 year delay of action A4 (Linking of environmental and health indicators) and timeline problems related to final interpretation of calculations, we have decided to organize these meetings during spring 2016 (May 2016). We have already started preparatory actions for organizing the meetings. We have selected 10 municipalities – 6 of them are located in the Eastern Slovakia and 4 of them are located in central Slovakia. We discuss all necessary issues with mayors of selected municipalities and they give us approval for organization of the meetings. All 10 municipalities are located in geological environment that was in our project defined as unfavourable for the human health and they are characterized with worse health status compared to Slovak average. We have started to prepare posters as well as presentation for residents.

There are no problems with implementation of this part of action.

To this action is associated one milestone “Organization of at least 10 informative meetings for public”. These meetings are defined as output indicators within “Training activities”. We assume total number of trained persons 600. To this action, another output indicator is associated, section “Publications – Posters” including publication of 5 types of posters – information posters for public audience.

2. Within proposal for legislative measures, the list of EI and HI will be elaborated with recommendation to monitor them including limit values for environmental indicators which were defined as the most influential to human health of residents in the Slovak Republic. This list will be compiled based on optimized datasets of environmental and health indicators elaborated within the actions A1, A2 and A3 that are published on the project website, session results – partial results. Limit values of EI for groundwater were elaborated within the action A5 (Environmental analysis) and are published on the project website. Limit values for EI in soils are in stage of elaboration. This part of action will be finished in accordance with modified project schedule referenced in the Progress report No. 2, to date 29.02.2016. It represents one of the project deliverables.

This action is in stage of high progress.

5.1.8 Action B1 – Overall project operation

The main task of this action is an effective and operational management of the project. Project team and steering committee meet in accordance with project schedule. Records from regular 2 month consultations and meeting of steering committee (1 per year) are published on project website. Project management is fully in accordance with project schedule and rules of LIFE+ programme.

The final report represents the deliverable associated to this action. After the approval of project amendment by EC – project end 1 year prolongation, we do not face any problems and we successfully meet all project objectives according to modified project schedule.

We plan to finish this action up to 30.11.2016.

The two of 3 associated milestones “Establishment of project management” and “Establishment of Steering committee” were successfully completed in accordance with the project schedule (see 4.1.19, table of milestones). The last milestone – “Project end” is supposed to be postponed to 30.08.2016.

5.1.9 Action B2 – Monitoring

This action is focused mainly on regular control and evaluation of each project action. The results (from the Mid-term report) of project monitoring are summarized in monitoring report from 20.11.2015 that is also published (in Slovak language) on the project website.

5.1.10 Action B3 – Audit

This action is planned to be implemented later on project implementation. We have already started public tender for audit implementation. Audit will be finished by 30.10.2016.

5.1.11 Action B4 – Networking with other projects

The main objective of this action is the study of all available materials relevant for the issue that project is focused on, communication with other groups and teams interested in and dealing with this issue and presentation of achieved results on the project through active participation on events at national as well as international level. So far we did not find any other project or working group that solve project of similar focus on summary evaluation of environmental and health indicators. Only partial projects exist focused on evaluation of certain group of elements, e.g. heavy metals, some deficit elements like e.g. I, Se, Zn, etc. The project Geohealth is highly innovative in the field of medical geology and for this reason we were not able to create networking group of the project so far.

We continuously excerpt and study findings and results of all other LIFE+ projects and available literature sources (mainly SCOPUS). We actively collaborate and exchange the information with ÚVZ SR, WHO office in Slovakia, Slovak Health University and other scientific and research institutions in the Slovak Republic.

On the international level, we have actively communicated by e-mail with representatives of e.g. US EPA (prof. Nauman, Dr. Lobdell), NIPH Prague (Dr. Kožíšek), Dallas University in Texas (prof. Finkelman) and WHO Europe – Centre for Environment and Health (Dr. Egorov) and many others. Two members of project staff participated the European meeting (of 27 EU countries) organized by WHO Regional Office for Europe (29.–30.10.2012, Bonn, Germany) dedicated to formation of European Environment and Health Information System (ENHIS). In July, 2014 three project team members actively participated (2 posters, 2 oral presentation) the International Symposium on Environmental Geochemistry and Health held in Newcastle Upon Tyne, UK, (SEGH conference). In October 2014, project team members presented achieved results of the project (3 presentations) on seminar organized in Prague, Czech Republic by Czechoslovak hydrogeochemical centre. In 2015, we planned to participate in the international conference MedGeo (organized by association Medical Geology) held in Aveiro, Portugal. We registered 3 presentations and 2 posters but we were not given approval by the director of ŠGÚDŠ for participation in this event. In October 2015, we planned to disseminate project results in Bonn, Germany, in the centre of WHO. The reason why we did not participate in this event was the same. Since we have problems with participation in international events and dissemination of project results abroad, we focused our attention to intensive communication with international experts through electronic media (e-mails, skype). This action is implemented according to project plan only partially.

5.1.12 Action B5 – After – LIFE Communication plan

The implementation of this action is planned later on. “After – LIFE communication plan” will be submitted with the Final report and will be completed before the end of the project, by 30.08.2016.

5.1.13 Action C1 – Notice boards

Project planned two notice boards to be displayed, in the premises of ŠGÚDŠ and Open-Air Mining Museum in Banská Štiavnica. Notice boards are displayed at strategic places in accordance with the project plan. This action - “Notice boards displaying” was completed as one of the project deliverables fully in accordance with the project plan (30.11.2011). 2 notice boards are also included in output indicators within “Media and other communication and dissemination work”.

5.1.14 Action C2 – Website

The website implementation – one of the project deliverables – was started with a little delay (20 days) but at the present the project website is fully in operation and we continuously add all important information, partial results and dissemination activities.

All relevant information and news related to the project implementation are published and updated on the website. The total number of website views up to 30.10.2015 was more than 14,100. This is one of the output indicators of the project within “Media and other communication and dissemination work”. The planned number of visitors per month was set to 100. At present time we have exceeded this output indicator more than 3 times. We can conclude that this output indicator is successfully fulfilled during the entire period of the project implementation and it reflects big interest of public but also scientific audience in our project and the results of our work.

This action is implemented fully in accordance with the project schedule and plan.

5.1.15 Action C3 – Layman’s report

This action was not implemented yet. Layman’s report will be compiled by 30.05.2016. It is also included as output indicator within the section “Publications” and deliverables.

5.1.16 Action C4 – Any media work

The objective of this action is intense widespread propagation of project results to layman and professional audience and to rise up general interest in objectives and achievement of project results. Within the project two press conferences held in the Ministry of the Environment (project start/project end) are planned. These are considered as output indicators of the project. The press release planned at the very beginning of the project was realized and fulfilled as project milestone in accordance with the project schedule (20.08.2011).

Based on general interest, other activities were planned to be implemented: newspaper articles – in national press (planned 3 as output indicators) and local press (planned 5 as output indicators), radio reportage (planned 3 as output indicators) and TV sessions (planned 2 as output indicators), mainly in the last year of project implementation (when we will have all relevant results) and after the project end. In addition we plan to publish internet articles through the project website (planned 7 internet articles as output indicators).

All these activities are included in the table of output indicators in section “Media and other communication and dissemination work”.

So far we have published 4 newspaper articles in national daily papers and 1 article in monthly paper “Zdravie”, we have realized 1 TV session and 2 radio sessions that we have mentioned in the previous reports (1 in local radio Medzibodrožie, Trebišov, 1 in national radio LUMEN). In the period from the Progress report No. 2 we have published in national daily paper “SME” another article „Banské lokality zdravie nepokazia“ that is also available at the project website in the section Project dissemination. This article was also published as internet article at the webpage <http://www.geology.sk/geohealth/category/diseminacia-projektuprojekt-dissemination/novinove-clankynewspaper-articles/>. In addition we have been contacted 1 time by TV (Slovak Television) and journalists (daily newspaper “Pravda”) and

asked to make an interview but the director of ŠGÚDŠ did not give us approval to make these interviews.

We have also published 5 internet articles – “Newsletters” (2 of them in the period between Progress report No. 2 and 3, see Annex 7.1.2) presenting the project objectives and partial results. We have several representatives of public as well as scientific audience which have subscribed to be given the information about the project through the project website - section Newsletter.

We can conclude that up to the Progress report 3 we have already published 6 newspaper articles, from which 5 of them were published in modified manner also as internet articles (total number of published internet articles is 7). 1 TV session and 2 radio sessions were realized. All so far realized “media works” had origin in direct interest and request from the journalists (they had primary information about the project from the project website) without our primary intervention.

We have already published on the project website the news about the organization of the International Conference SEGH in Bratislava in June 2015.

In the fifth year of project implementation (when we will have more results) we will contact media and we hope that wide dissemination of project results will be done through different type of media. In addition we were contacted by e-mail and phone by more than 300 inhabitants with queries related to environment issue and health state of Slovak population. We have answered all queries in short time.

We summarize so far completed output indicators in table below.

Output indicators – Media	Project plan within this action	So far realized	
		No. of completed outputs within reporting period	Total No. of completed outputs
Press releases made by the project	2	0	1
General public article in national press	3	1	4
General public article in local press	5	0	1
Internet article	7	3	8
TV news/reportage	2	0	1
Radio news/reportage	3	0	2

The action is implemented in accordance to the project schedule.

5.1.17 Action C5 – Workshop, seminar, conference

In accordance with project schedule, one workshop (international, 0-25 participants), two seminars (national, 1 for administrative officers, 25-75 participants and 1 for public audience and scientists, more than 100 participants) and one conference (international, more than 100 participants) are planned to be organized. These activities are considered as output indicators of the project and they are included in table of output indicators in section “Workshops, seminars and conferences”.

Workshop (international) was held during 31.05.-01.06.2012 in Bratislava, Slovak Republic in the premises of ŠGÚDŠ. The results of workshop including all oral presentations are available online on the project website.

International conference “The link between environment and health” was organized in June 2015 (milestone of the project). The outputs of this conference are published on the project website. We welcomed more than 100 delegates, 65 foreign participants and more than 40 Slovak participants that actively joined the conference. The conference website was implemented to disseminate the event and project objectives (<http://www.geology.sk/geohealth/segh-conference-2015/>). We have actively disseminated

project results in the form of keynote lecture. We attach this presentation as Annex 7.1.3 of this report.

The conference was supported by a member of ASTRALE team – Mrs. Lucie Trokanova who presented short speech about the LIFE+ programme during the conference and chaired the desk of propagation materials for LIFE+ programme as well. Photo documentation of this event is attached as Annex to this report (Annex 7.1.4).

We propose to organize national seminar (for experts as well as public) and propagation seminar (for administrative officers) about 3 months before the end of the project. Based on our experience achieved during project implementation we are now not able to predict enough number of participants (as planned within the project – 100 for both seminars). People who might be interested in the issue of geological environment and health that this project deals with are often too busy due to their work as well as personal worries and they use to ask the information they are interested in through e-mail communication. That is why we integrate both seminars into one event. Organization of national seminars and is included in milestones of the project.

The action is implemented in accordance with the project schedule.

5.1.18 Action C6 – Technical publications of the project

Project has in plan to publish results in several forms. Besides of final monograph and Layman’s report, mainly publishing of scientific articles (3 in international impacted magazines, 6 in Slovak magazines) and several papers in different conference books of proceedings / abstracts are planned to be realized. We also plan to publish at least 5 posters and present them on national and international level. The output of the organization of the conference, seminars will be the publication of at least 2 Books of abstracts.

All above mentioned activities are included in output indicators of the project, section “Publications”.

So far, we have compiled following publications:

1. International impacted magazines: 2 articles were published in the international magazine “Environmental Geochemistry and Health” and 1 article was published in “European Journal of Biomedical Informatics”.
2. International magazines: 1 article published in “Open Journal of Geology”.
3. Articles in Slovak magazines, Books of Proceedings: 12 articles (5 articles published since the Progress report No. 2 and are published on the project website, session dissemination, publications).
4. Book of abstracts: 1 conference book of abstracts was published in electronic as well as printed version within the organization of the international conference SEGH 2015 “The link between environment and health”, organized within this project (attached as in electronic form at USB key, Annex 7.1.5).

All publications are published also through the project website in the section “Publications”. Except of articles published in the magazines, we have also published the papers from presentations at international conferences in the conference Books of Abstracts with highlighted acknowledgment and reference to the LIFE+ programme. All these publications including presentations are published on-line on the project website. We provide the copy of one presentation from the international conference organized in Bratislava, SR in June 2015.

The action is implemented without any problems encountered and in accordance with project schedule and intentions.

5.1.19 Educational activities

The project has not directly in plan any educational activities included, nevertheless the project team members are very active and act in the field of education of students including:

- Secondary school - Medical High school, University of Pavol Jozef Šafárik, Košice (subject “Hygiene of the Environment”, lecturer Z. Dietzová),

- University (higher education) - Comenius University Bratislava (division of environmental geochemistry, subject – “Environmental Geochemistry 2”, lecturer S. Rapant, K. Fajčíková).

These educational activities are considered as output indicators and are implemented continuously.

In addition, we have continued 1 Diploma thesis and 1 PhD thesis focused on the issue solved within the project (relationship between environmental and health data), in accordance with other planned activities within the project.

One Diploma thesis (student Mgr. G. Siposz) realized at Comenius University was successfully finished in May 2014 (leadership doc. S. Rapant) and 1 diploma thesis (student Daša Pauliková) started from September 2014 (leadership by K. Fajčíková).

5.1.20 Completion of deliverables, milestones, significant indicators of progress and report foreseen

The completion of planned deliverables, milestones and indicator of progress and reports is reviewed in table form below. Deadlines are in accordance with modified project schedule within approved project grant agreement.

Deliverables products of the project

Name of the Deliverable	Code of the associated action	Deadline	Actual date/
Website– running	C2	1/12/2011	20/12/2011
Dataset of environmental indicators in numeric and map form	A1	30/05/2012	20/05/2012
Dataset of health indicators in numeric and map form	A2	30/04/2012	20/04/2012
Datasets of environmental and health indicators divided according to geological environment and contaminated areas in numeric form	A3	30/11/2012	25/11/2012
Optimized datasets of environmental indicators and health indicators in text form – tables	A4	30/05/2013	20/05/2013
Assessment of impact of geological environment on health status of inhabitants – short report	A5	30/07/2013	17/07/2013
Elaboration of limit values for environmental indicators, tables	A5	31/01/2016	
Compilation of environmental-health regionalization of the Slovak Republic (maps, tables, short text)	A5	30/08/2015	30/08/2015
Delineation and characteristics of areas with unfavourable health status of inhabitants, maps, tables, short text	A5	30/03/2016	
Proposal of measures for reduction of negative impact of geological environment on health status of residents, text report and factsheet	A6	30/12/2015	19/10/2015
Publishing of results in international impacted magazines – 3 publications	C6	30/03/2015	30/03/2015
Proposal of list of environmental and health indicators and limit values of environmental indicators for implementation into Slovak legislatives, tables, factsheet	A7	10/02/2016	
Technical publications of project – monograph (in Slovak) and brochure (in English)	C6	30/05/2016	
Layman’s report	C3	30/05/2016	
Final report	B1	30/11/2016	
Significant indicators of progress that should be included in “deliverables”			
Notice boards – displaying	C1	01/12/2011	30/11/2011

Milestones of the project

Name of the Milestone	Code of the associated action	Deadline	Actual date * New proposed deadline
Establishment of project management	B1	30/09/2011	20/09/2011
Establishment of Steering committee	B1	30/10/2011	20/10/2011
Purchase of 2 PC	A1	15/12/2011	10/01/2012
Completion of excerption of environmental data	A1	30/01/2012	15/01/2012
Completion of excerption of medical data	A2	28/02/2012	20/02/2012
Organization of workshop with international participation and agreement on methods of data elaboration	A3, A4	30/05/2012	30/05/2012
Selection of subcontractor for calculation of neural network and fuzzy cluster analysis	A4, A5	30/08/2012	10/07/2014
Linking of datasets on environmental and health indicators	A4	30/03/2015	30/03/2015
Organization of seminar (for Slovak participants)	C5	30/05/2016	
Organization of at least 10 informative meetings for public	A7	30/10/2015	*30/06/2016
Organization of conference with international participation	C5	30/06/2015	30/06/2015
Organization of propagation seminar for administrative officers	C5	30/06/2016	
Project end	B1	30/08/2016	
Significant indicators of progress that should be included in „milestones“			
Press conference /Press release at the beginning of the project	C4	30/09/2011	20/08/2011
After – LIFE communication plan	B5	30/11/2016	*10/08/2016
Audit	B3	30/11/2016	
Press conference at the end of the project	C4	30/05/2016	*30/08/2016

Report foreseen

Type of report	Deadline	Actual date/
Inception report	30/12/2011	15/12/2011
Progress report n° 1	30/10/2012	10/10/2012
Mid-term report	30/08/2013	10/08/2013
Progress report n° 2	30/10/2014	30/10/2014
Progress report n° 3	30/11/2015	
Final report with payment request	30/11/2016	

5.1.21 Progress of the project comparing with the timetable

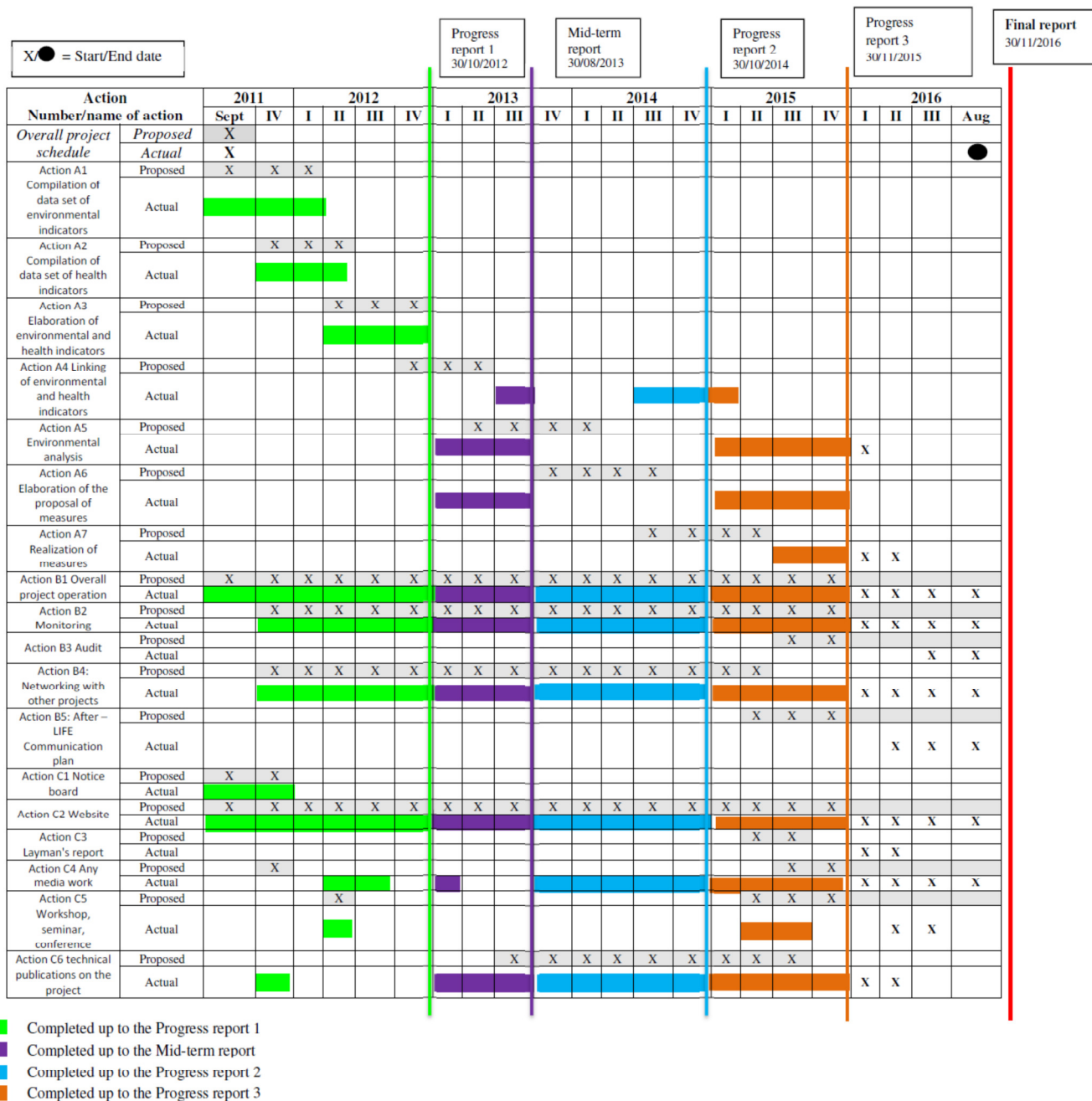
The project progress in planned actions (proposed/actual status) is illustrated on Gantt chart in chapter 4.2. Compared to project modified schedule (in accordance with approval of project amendment) we plan to prolong deadline for organization of informative meetings and final press conference and according to recommendations of EC also deadline for elaboration of After-life communication plan.

5.2. Envisaged progress until next report.

Up to the Final report (deadline 30.11.2016) we will progressively solve all remaining actions. Since we have all input data and all necessary calculations we will focus our attention on their interpretation to meet all project objectives successfully and in high quality. We have moved the organization of all 10 informative meetings to spring 2016 (May-June 2016). We plan to organize meetings in municipalities with population up to 1000 inhabitants. The modified deadline is the most suitable because of weather and fit also to residents in selected municipalities. They are able to participate in the meetings because they have more free time. During summer many of them are away on holidays and during autumn they are busy with harvest. From the very beginning of 2016 we will focus on preparation of Layman's report and final monography. Technical papers – scientific articles have been

already published in planned number, even they are of higher number that was planned. We will also contact media and inform them about achieved results. All planned actions are illustrated on Gantt chart below.

Gantt chart



5.3. Impact

Project concept is based on following principles: first 4 years of implementation and solving of technical (scientific) issues and last year after the completion of results their dissemination will follow. Then we will be able to evaluate project impact in objective manner.

Project impact can be expected from following reasons. Up to date in Slovakia there is missing relevant quantitative information on possible negative impacts of unfavourable

geological environment on health status of residents except of significantly contaminated areas. Our project is based on realization of comprehensive identification of causes and possible negative effects of geological environment on health status of resident population. The realization of proposal of measures for minimizing of the impact of geological environment will be implemented in collaboration with not only administrative organs but also common inhabitants and mayors of concerned municipalities. Project impact can be expected and evaluated in 4 levels:

1. *Community of professionals / experts,*
2. *Media,*
3. *Administrative organs,*
4. *Inhabitants, mayors of municipalities.*

Impact on experts

We are observing the impact of our project on community of experts. We have already registered more than 100 requests, mainly from the foreign experts for publications and information on our project.

Impact on media

Media have shown interest in our project. 6 newspaper articles presenting current results of the project were published. Mainly the newspaper article (published in daily news SME – “Chcete zdravé žiť”) which was published also as internet article has highly raised public awareness (Slovak residents). More than 100,000 visitors were documented during one week to see the internet article and several residents of the Slovak Republic contacted us (by e-mail, phone) because of their big interest in the project topic in relation to the potential environmental-health problems in their municipalities. TV session (in national TV JOJ) and radio session (in national radio LUMEN) also contributed to the dissemination of project objectives and conditioned several phone calls or e-mail requests from the Slovak residents.

Impact on administrative organs

Administrative organs did not have contacted us so far officially. Unofficially we were asked to discuss and present our results achieved within the project. The administrative organs but also the members of the *Steering committee* recommend us to present the project results in very restrained and gingerly manner towards media and also for medical community. The main indirect impact for administrative organs, is considered to be the interest of the head of hygienists of the Slovak Republic and the director of WHO office in Slovakia in project results, mainly legislative proposal for new limit values of environmental indicators.

Impact on inhabitants, mayors of municipalities

We have registered big interest in our project by the inhabitants and mayors of municipalities. We have more than 14,100 views of our project website from the very beginning of the project (47 months of website running) and we suppose that the majority was this group of persons concerned in project objectives and results. In addition, we have registered at least 400 requests by e-mail, post and phone for more detail information about the environment and health status of residents in their municipalities.

The review of various impacts (for the entire period of project implementation) according to individual objects of impact is summarized in table below.

Object of Impact		Type of impact	Status to 10.10.2015
Community of experts		Request for information on project, publications	100
Media	Newspaper	Newspaper articles	6
	Radio	Sessions	2
	Television	TV-shots	1
Administrative organs		Legislative proposals	0
Inhabitants, mayor of municipalities		Website information	> 14,100
		Direct phone, post, e-mail requests	400

The presented impacts are included in “output indicators” specified in accordance with instructions of the European Commission in section of annexes of Mid-term report.

The main impact of the project GEOHEALTH will be the improvement of the health state of residents of the Slovak Republic through proposal and dissemination of measures necessary for elimination of the negative impact of the geological environment. These measures will be disseminated during the final stage of the project realization.

Indirect impact

We have observed indirect impact of our project in case of oral lectures presented by project manager during the conference “Životné podmienky a zdravie” to public health community (22.-24.9.2014, Nový Smokovec). Presentation of project background and objectives was of great concern of participants; mainly regional hygienists were interested in project results, namely in the impact of soft water on cardiovascular and oncological disease occurrence. There was a fruitful discussion on how we can supply residents with increased Ca and Mg contents in water. One of the solutions is mixing of different water sources used for public water supply under the auspices of individual water companies (mixture of low and high mineralized water).

Long-term impact

The main project objective is an improvement of health status of residents in the Slovak Republic. The main results of this project are following: Deficit contents of Ca and Mg in geological environment have impact on increased incidence of cardiovascular and oncological diseases that represent the main causes of deaths in the Slovak Republic (about 75%). That is why we have to disseminate these results widely among experts as well as public audience. Increase of contents of Ca and Mg in groundwater/drinking water is rather complex issue representing technologically and economically challenging process. However, the use of vitamins and mineral supplements of Ca and Mg in areas with low mineralized groundwater used for drinking purposes is available to wide layers of population. The main problem is that this measure must be widely disseminated among residents. This is our task during the last year of project implementation. We suppose that this step will lead to gradual improvement of health status of inhabitants. It can be measured only after longer period; we suppose that first positive measurable results can be observed after 5 years from the end of the project.

5.4. Outside LIFE

Based on preliminary project results and online communication with other experts and scientists on international level, project manager was involved into research team of new

project “Support for soil quality and human health in an urban environment”, proposed to be implemented within the programme HORIZON 2020.

6. Financial part

We have included answers to EC comments (letter to Progress report No. 2 dated to 16.03.2015, letter to monitoring visit dated to 07.07.2015) related to financial part of the project as Annex 7.a of this report. We attach also 3 examples of invoices as annexes 7.2.1-7.2.3. We provide updated information about the costs spent so far in respective table (section 6.1).

6.1. Costs incurred

During the 49 months of the project implementation (IX. 2011 – X.2015) 277,328.35 Euros were spent so far. It is more than 66 % from the projected final costs. Total costs incurred from the start of the project do not include costs spent for works within the action A4 “Linking of environmental and health indicators”, realized in the form of external assistance in the amount of 25,000 Euros. These spent costs were paid until November 2015. Including this item into account we reach about 75% of costs spent so far from the project budget. In addition, there are remaining actions with higher costs planned for their realization such as informative meetings for Slovak inhabitants, print of Layman’s report, posters, and leaflets, books of abstract and final monograph were not realized so far. The status of project costs spent so far is adequate to the status of works on the project actions. For this reason we do not assume any budget modification to be necessary.

Following table in action costs is filled in according to the project proposal.

The incurred project costs

Budget breakdown categories	Total cost in €	Costs incurred from the start date to 10.10.2014 in €	% of total costs
1. Personnel	192,162	159,150.30	82.82
2. Travel and subsistence	32,300	13,172.72	40.78
3. External assistance	123,500	68,673.80	55.61
4. Durable goods			
Infrastructure	0	0	0
Equipment	3,000	2,928.00	97.60
Prototype	0	0	0
5. Land purchase / long-term lease	0	0	0
6. Consumables	32,450	8,717.95	26.87
7. Other Costs	7,500	6,638.38	88.51
8. Overheads	27,200	18,047.20	66.35
TOTAL	418,112	277,328.35	66.33

Following table in action costs is filled in according to the project proposal.

Action number and name	Foreseen costs	Spent so far	Remaining	Projected final cost
Action 1 "A1"	13,976	13,770	206	13,976
Action 2 "A2"	6,936	6,742	194	6,936
Action 3 "A3"	17,486	17,486	0	17,486
Action 4 "A4"	94,406	68,689.4	25,716.60	94,406
Action 5 "A5"	39,232	37,556	1,676.0	39,232
Action 6 "A6"	19,692	19,468	224.0	19,692
Action 7 "A7"	69,870	22,621	47,249.0	69,870
Action 8 "B1"	20,790	18,048	2,742.0	20,790
Action 9 "B2"	6,380	4980	1,40	6,380
Action 10 "B3"	6,000	0	6,000	6,000
Action 11 "B4"	24,106	15,046.32	9,059.68	24,106
Action 12 "B5"	0	0	0	0
Action 13 "C1"	2,861	2,496	365.0	2,861
Action 14 "C2"	7,760	7,620	140.0	7,760
Action 15 "C3"	3,103	0	3,103.0	3,103
Action 16 "C4"	1,003	754	249.0	1,003
Action 17 "C5"	29,435	11,509.31	17,925.69	29,435
Action 18 "C6"	27,876	12,495.12	15,380.88	27,876
TOTAL	390,912	259,281.15	131,630.85	390,912