



Capacity-Building in the Field of Higher Education: INTENSE



2.1.2021

# Sustainability plan

## ‘INTENSE: Integrated Doctoral Program for Environmental Policy, Management and Technology’

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## **Development of the Sustainability plan**

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The primary goal of the sustainability plan is twofold: to further extend the use, implementation and development of the INTENCE project results and deliverables, and to propose specific actions which promote its further exploitation. Towards this direction, its main objectives include:

1. To ensure the further use of INTENCE project results, tools and services after the completion of the project works.
2. To propose actions for further exploitation of the INTENCE project results and solutions.
3. To suggest mechanisms as well as development and implementation actions for extending and improving INTENCE results and deliverables following the project's end.

Hence, the sustainability plans will attempt not only to provide the INTENCE project activities beyond the end of the project (and the associated end of the EC funding), but also to enhance their functionality and increase its outreach.

Planning for the sustainability of the project should occur throughout the life of the project to maintain desired outcomes after the grant period has ended. When drafting a sustainability plan, it is important to establish whether the entire innovation will be sustained or selected components. After the post-grant period has been clearly defined, a plan for sustaining the necessary implementation supports, infrastructure, and funding can be developed.

Sustainability is defined as the ability to achieve desired outcomes and maintain the ability to continue activities over time. The sustainability of project and post-project activities is ensured from the stage of the application to activities after the end of the project.

An approach of evaluating INTENCE project sustainability and the development of Sustainability plan based on the studying of project activities, project results and deliverables (through web-site, mass-media and social networks), semi structured interviews with representatives of partner universities and was conducted into 3 phases (Table 1).

Table 1 – Matrix of the Sustainability plan

	<b>Phase 1: Build Project (organizational) profile</b>	<b>Phase 2: Complete Sustainability assessment</b>	<b>Phase 3: Create actions for Sustainability plan</b>
<b>Who?</b>	Partner universities	Representatives of the universities, external expert	Partner universities, external expert
<b>What?</b>	Key information about a network of the partner universities, Project Application	Interviews, discussions, project deliverables, activities and etc.	SWOT-analysis, Selected opportunities for sustainability, Mitigated threats and weakness, Planned sustainability actions
<b>Why?</b>	Prepare for Phase 2 by bringing all of project's systems into view	Identify specific areas of Partner universities and focus on activities increasing the probability of being sustainable over time	Outline how partner universities will address selected opportunities for improvement and provide insight on improving sustainability over time
<b>How?</b>	Summarize key information in <i>Short description of the project</i>	Complete Sustainability assessment in <i>Implementation status of partner universities</i>	Create Sustainability plan

Development of the Sustainability plan included 3 phases (Figure 1): describing organizational profile, evaluating sustainability and development Sustainability plan based on strengths and opportunities of Partner universities.

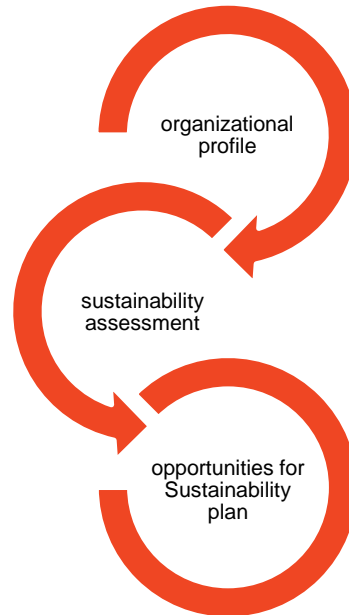


Figure 1. Phases of the Sustainability plan development

This report is organized into 3 parts: the first is about project consortium (Short description of the project), the second part presents sustainability assessment (Implementation status of partner universities), in the last part you could find Sustainability plan.



## Short description of the project



### Integrated Doctoral Program for Environmental Policy, Management and Technology / INTENSE



Project partners:

P1 Estonian University of Life Sciences (EMU)

P2 University of Natural Resources and Life Sciences, Vienna (BOKU)



P3 University of Latvia (LNU)



P5 Odessa State Environmental University (OSEN)

P6 V.N. Karazin Kharkiv National University (KKNU)

P7 Institute of Ecology of the Carpathians of the National Academy of Science of Ukraine (IECNASU)



P8 National University of Mongolia (NUM)

P9 Khovd University, Khovd



P10 Hanoi University of Science and Technology/TRUONG DAI HOC BACH KHOA HA NOI (HUST)

P11 Ho Chi Minh City University of Natural Resources and Environment (HCMUNRE)



### Project aims and objectives

(1) To improve the practice of doctoral training and professionalise its governance by integrating PhD programs dealing with environmental policy, management and technology in 7 PCIs to 3 nationwide integrated doctoral schools (INTENSE NIDS), based on common Code of Operational Practices & research framework (COP & RF) adhering to the principles of the EHEA, and consolidating these schools into the INTENSE International Network.



(2) To enhance doctoral training provision by integrating and upgrading existing learning contents that can be used for doctoral provision (total 80 ECTS by M48), infrastructure for accessing the courses and setting&monitoring flexible research training trajectories and their progression (INTENSE open education platform, including sustainable mechanisms for its development and maintenance) and shared access to research facilities.

(3) To build the capacity of PhD students to improve their published output, through a strengthened multidisciplinary approach to doctoral training, aided by facilitating access to global and EU research networks (including facilitation of academic mobility), development of transferable skills, promotion of joint research/supervision arrangements and interdisciplinary and practice-oriented thesis topics.

### List of short and long term impact indicators

Table 1 – Short term impact indicators

Short term impact	Target groups/potential beneficiaries	Quantitative indicators	Qualitative indicators
Enhanced quality of doctoral provision in environmental studies at PCIs	Student, academic staff at PCIs, research administrators, institution	80 PhD students enrolled to INTENSE by M48; Access to INTENSE distance learning infrastructure and e-courses (over 90% of enrolled students using e-services)  Increased publication activity of PhD students and their supervisors (10% more papers submitted by INTENSE PhD students compared to the numbers achieved by the same amount of first-year PhD students before INTENSE)	Better progression of PhD theses, as noted in progression reports  Application of governance and QA guidelines at all the PhD programs concerned
Dissemination of knowledge	UnderPhD and	Feedback on PhD student performance from	Satisfaction of their audience, as

and skills to wider student body through demonstrating and teaching by PhD students	Masters students	anonymous questionnaires (over 75% of underPhD students are satisfied with teaching by PhD students, as demonstrated in course surveys)	demonstrated by overly positive anonymous comments in course surveys
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Table 2 – Long term impact indicators

<b>Long term impact</b>	<b>Target groups/potential beneficiaries</b>	<b>Quantitative indicators</b>	<b>Qualitative indicators</b>
Improved quality assurance	Administrators, supervisors, students	N/A	Positive feedback from institution and ministries of education / doctoral degree attestation bodies, as demonstrated by their official letters and in the end-of-the project survey
Access to INTENSE e-learning	PC academic institutions involved to INTENSE, INTENSE PhD students and supervisors	Access arranged and reported to PhD students at 7 PC academics institutions involved in INTENSE and the associate partners joining INTENSE schools (at least 3) by M23	Positive feedback from PhD students and supervisors on access arrangements, as notices in the end-of-the-project survey
Online and offline research collaboration and shared access to research facilities	PhD students and PIs and their supervisors	At least 20% of PhD students requested and receives access to INTENSE shared research facilities  At least 10% of PhD students involved in	Positive feedback from PhD students and supervisors on online&offline collaboration and on access arrangements, as notices in the end-



		research collaboration through online tools	of-the-project survey
Promotion of INTENSE as the network of research excellence to the international academic community	International students outside PCs potentially interested to pursue PhD in environmental studies and interested in the region; researchers looking for collaboration in the region or within INTENSE topics	All the INTENSE-endorsed international conferences resulting in special issues in international peer-reviewed journals with impact factor over 1 (by M36)	Emerging international visibility of the INTENSE network and enhanced visibility of INTENSE partners, as demonstrated by the number and level of participants on INTENSE conferences
Graduation (successful completion of PhD programme)	PhD students enrolled on the INTENSE programme	After the end of the project:  Number of students graduating compared with those that are not enrolled plus in comparable non-participating school/universities in the partner countries (at least 10% higher)	Overly successful progression of INTENSE students, as demonstrated in their accreditation reports
Employability	PhD students	After the end of the project:  Number in professional posts relevant to their PhD programme one year following graduation (at least 10% of increase within 5 years after the end of the project)	Interest of potential employers in INTENSE PhDs, as demonstrated in the end-of-the-project survey

Publication in peer-reviewed international journals	Student, supervisors	<p>During the project:</p> <p>At least 20% of INTENSE PhD students have made submissions to international peer-reviewed journals by M48</p> <p>After the end of the project:</p> <p>Number of publications relating to the PhD compared students graduation prior to the INTENSE program (at least 10% of increase within 5 years after the end of the project)</p>	N/A
Number of applications from prospective PhD students	Supervisors, institution	<p>During the project:</p> <p>All the vacancies filled in UA and 5% growth in MN&amp;VN in the 2<sup>nd</sup> INTENSE intake compared to the 1<sup>st</sup> one</p> <p>After the end of the project:</p> <p>Number of applications prior to and after involvement in the INTENSE programme (at least 10% of increase within 5 years after the end of the project). Number of viewings of school, institution web-</p>	N/A

		sites/requests for information (at least 20% of increase within 5 years after the end of the project)	
Sharing and dissemination of best-practice	Institution, partner country	<p>During the project:</p> <p>At least 5 new institutions expressed interest in joining INTENSE schools by M48</p> <p>Adoption of some or all of the components of the INTENSE program by at least 4 institutions within the partner countries and elsewhere</p> <p>After the end of the project:</p> <p>Number of dissemination events or talks on external events (at least 3 events per year)</p>	
Improved quality assurance	Institution, partner country	<p>After the end of the project:</p> <p>Improved scores of participating institutions/schools in national, regional and world research and student satisfaction rankings (at least 10% of increase within 5 years after the end of the project)</p>	Peer-review process launched and overly positively evaluated in the end-of-the project
Improved	PC institutions	Number of applications	Progress in

international profiles and visibility of PC institutions	involved to INTENSE schools	from prospective international PhD students (at least 20% of increase within 5 years after the end of the project)	international rankings (where applicable)
More competitive research outcomes delivered to end-users	Governments at all levels, companies, NGOs, broader society	After the end of the project: Increased R&D-related income (at least 10% of increase within 5 years after the end of the project)	Satisfaction of end-users and broader stakeholder circles
Promotion of INTENSE as the network of research excellence to the international academic community	International students outside PCs potentially interested to pursue PhD in environmental studies and interested in the region; researchers looking for collaboration in the region or within INTENSE topics	At least 2 INTENSE- endorsed international conferences annually, resulting in special issues in international peer-reviewed journals with impact factor over 1; at least 10 good applications from international students on the 1 <sup>st</sup> year after the end of the project	Enhanced international visibility of the INTENSE network and the partner institutions; overall interest of international students and researchers in the INTENSE and its members

**Dissemination and exploitation strategy. Sustainability of the project**

Specific target groups upon which INTENSE dissemination and exploitation activities will be focused:

- (1) PCIs within INTENSE: PhD students & supervisors, prospective PhD students, research administrators;
- (2) PCIs outside INTENSE: students, academic and administrative staff;
- (3) PC ministries of education, other relevant bodies;
- (4) Other stakeholders in PCs: government, NGOs, companies, broader public;
- (5) International applicants to PhD students and researchers.

The INTENSE web-portal will be the main communication tool. It will contain project news, announcements, discussion section, surveying tools, document repositories, & links to e-services that will serve as a dissemination platform on its own targeting groups 1,2,5. All the PIs will be contributing to the development of contents.

The consortium will circulate a regular newsletter targeting all the groups. Social media (Twitter, FB) will be exploited. PIs will hold responsible for media coverage of INTENSE events they are involved to. INTENSE newsletters and social media presence will last after the end of the project. INTENSE conferences will enhance the visibility to PCs academia.

The consortium development of the broader INTENSE network through academic exchange, conferences addressing multidisciplinary environmental issues relevant for the region, publication projects, open call training events etc. The dissemination will be based on existing institutional networks. Ministries of education will support dissemination of the INTENSE RF&COP through administrative channels.

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## Analysis of the progress

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Implementation status of the project progress was evaluated based on next criteria:

**Exceeding Target (ET):**

The project has gone beyond the requirements of the defined ESAP target and evaluation criteria within the defined timeframe.

**Achieved Target (AT):**

The project has achieved the ESAP action targets and fulfilled the evaluation criteria within the defined timeframe.

**On Target (OT):**

The project is on target for achieving ESAP action targets and fulfilling the evaluation criteria within the defined timeframe.

**Minor Delay (MD):**

The project has not achieved the ESAP action targets within the defined timetable but has put systems, processes or mitigation measure in place, which are working towards addressing the deficiencies within a reasonable timeframe. In such case please specify the new target date.

**Significant Delay (SD):**

No significant progress has been made towards achieving the ESAP action targets within the defined timeframe. In such case please specify the new target date.

**Not Applicable yet (NA):**

The defined ESAP action is not applicable yet, e.g., if the project is currently at design stage and the defined ESAP action will be applicable only during the operational stage.

Table 3 – Implementation status of short term indicators

Indicator	Implementation status	Comments
<b>Enhanced quality of doctoral provision in environmental studies at PCIs</b>		
80 PhD students enrolled to INTENSE by M48;	OT	
Access to INTENSE distance learning infrastructure and e-courses (over 90% of enrolled students using e-services)	OT	
Increased publication activity of PhD students and their supervisors (10% more papers submitted by INTENSE PhD students compared to the numbers achieved by the same amount of first-year PhD students before INTENSE)	N/A	
<b>Dissemination of knowledge and skills to wider student body through demonstrating and teaching by PhD students</b>		
Feedback on PhD student performance from anonymous questionnaires (over 75% of underPhD students are satisfied with teaching by PhD students, as demonstrated in course surveys)	N/A	

Table 4 – Implementation status of long term indicators which could be achieved to the end of the project

Indicator	Implementation status	Comments
<b>Access to INTENSE e-learning</b>		
Access arranged and reported to PhD students at 7 PC academics institutions involved in INTENSE and the associate partners joining INTENSE schools (at least 3) by M23	AT	
<b>Online and offline research collaboration and shared access to research facilities</b>		
At least 20% of PhD students requested and receives access to INTENSE shared research facilities	NA	Due to Covid-19

At least 10% of PhD students involved in research collaboration through online tools	NA	Due to Covid-19
<b>Promotion of INTENSE as the network of research excellence to the international academic community</b>		
All the INTENSE-endorsed international conferences resulting in special issues in international peer-reviewed journals with impact factor over 1	AT	
<b>Publication in peer-reviewed international journals</b>		
At least 20% of INTENSE PhD students have made submissions to international peer-reviewed journals by M48	AT	
<b>Number of applications from prospective PhD students</b>		
All the vacancies filled in UA and 5% growth in MN&VN in the 2 <sup>nd</sup> INTENSE intake compared to the 1 <sup>st</sup> one	AT	
<b>Sharing and dissemination of best-practice</b>		
At least 5 new institute-ions expressed interest in joining INTENSE schools by M48	OT	
Adoption of some or all of the components of the INTENSE program by at least 4 institutions within the partner countries and elsewhere	OT	
<b>Adoption of some or all of the components of the INTENSE program by at least 4 institutions within the partner countries and elsewhere</b>		
At least 2 INTENSE-endorsed international conferences annually, resulting in special issues in international peer-reviewed journals with impact factor over 1	OT	
At least 10 good applications from international students on the 1 <sup>st</sup> year after the end of the project		



## **Implementation status of partner universities**

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### **Results of the interviews**

#### **V.N. Karazin Kharkiv National University**

The University has educational program on specialty "Earth Sciences".

The university took part in the development of the doctoral school: it developed the curriculum and content of academic disciplines. The content of academic disciplines was developed, among other things, in collaboration with lecturers from partner universities.

The university uses the Moodle platform to host course materials. It is planned to create a full-fledged educational and methodological complex for each course.

The curriculum of the doctoral school was approved by the Academic Council of the University, and it is already possible to train postPhDs according to it. This educational program is already included in the university list of educational programs and could be seen on the university website.

Regarding cooperation with other Ukrainian universities partners (Odessa and Lviv), it should be said that initially it was planned to exchange students who were supposed to come to study, but Covid-2019 made its own adjustments and the university began to consider the possibility of distance learning for PhD students. On October 15, online courses began at the university, which is related to quarantine.

The question remains about the sharing of equipment. this is possible only directly in the laboratories of partner universities, and neither PhD students nor university scientists can come and work.

There is an idea of joint leadership of PhD students, when professors from partner universities jointly supervise the scientific work of young scientists. Even though the idea was actively discussed and worked out, it has not yet been implemented. Probably, in the next academic year we will be able to implement this idea.

The university has experience of joint leadership and based on the results of communication with environmental scientists from other universities, it can be concluded that there is interest in such a form of work as joint scientific leadership, but it is not always feasible in practice. Currently, university PhD students are advised by professors from Lviv and Uman, 1 PhD student from Uman is already join to doctoral program.

In order to establish joint leadership, the university needs to strengthen horizontal links with other universities, because at present time the decision on joint leadership, especially on a volunteer basis, is a decision on personal connections, trust and authority between professors and universities.

After conducting a screening analysis of Ukrainian universities, the project coordinators at the university believe that universities that do not have doctoral programs on environmental specialties, can become potential universities for networking and attracting PhD students and professors to a doctoral school. Thus, the marketing policy of the university, aimed at ensuring the sustainability of the doctoral school in the future, should include measures to analyze the availability of postPhD studies of the environmental programs at universities (the situation is dynamic, due to the accreditation procedure it constantly changes - it opens somewhere, somewhere programs are closed), prompt informing of such universities, an offer of cooperation - joint leadership + training of PhD students. It is necessary to have information materials of an advertising nature for such information. And, of course, it is necessary to develop an operating mechanism for joint leadership within the framework of Ukrainian legislation.

The best option would be to create an open consortium to start Ukrainian universities. Within the framework of the project, such a consortium was created between partner universities. But if we want to ensure the sustainable functioning of the doctoral school in the future, we must create such an open structure. Open in the sense that any university in Ukraine can join (and leave) it. The purpose of such a consortium is to ensure sustainable and high-quality training of scientific personnel, intensify scientific research and joint scientific projects in the field of ecology.

The first step has been taken - a consortium of Ukrainian universities has been created. The next step should be the creation of an international consortium comprising partner universities of the project. For the doctoral school to become international (which will be another factor in its sustainability), it is necessary to develop courses in English. This academic year, elective courses (optional) in English are being tested remotely on the Moodle platform. Materials on these disciplines are developed in Ukrainian and English. The next step should be to develop required courses in English too. After the implementation of this stage, full-fledged postPhD study of students of at least partner universities (Vietnam and Mongolia) will become possible. You can start with distance learning. By agreement with partner universities, at the beginning of such cooperation, it is possible to teach only a part of the disciplines necessary for PhD students (because the requirements for the educational program and possibly the list of compulsory disciplines may differ).

This academic year, PhD students from partner universities were not recruited. As a test run-in, we can work with PhD students from Mongolia and Vietnam remotely to improve

the content and teaching methods of training courses (of course, we will talk about individual courses from a block of elective disciplines).

At the meeting of the project consortium, it is necessary to discuss which courses can be provided by the Ukrainian side, which of them are in demand by the Mongolian and Vietnamese partners. Further - what PhD students will study them, how their certification will be carried out and how the certification results will be taken into account at the university where these PhD students' study.

To increase the efficiency of work and ensure the sustainability of the doctoral school, regular meetings are required, to update agreements, discuss work for the academic year - on filling courses, on teaching methods, on research topics, joint use of equipment and joint scientific leadership. Apparently, this will have to be done not only within the framework of the project, but also when the project is over. Such meetings do not have to be face-to-face, most likely their format should be online (covid has shown the effectiveness of such meetings and conferences, and in addition, all universities have improved their technical base for such meetings, and their staff significantly improved digital skills).

For the sustainability of the doctoral school, it is important to involve PhD students from other countries, not only the partner countries of the project. In addition to the development and filling of courses and disciplines, it is necessary to develop information materials to promote the doctoral school in European countries and think over a strategy for their dissemination.

### **Institute of Ecology of the Carpathians of the National Academy of Science of Ukraine (IECNASU)**

The Institute of Ecology of the Carpathians is a research institute, therefore, only PhD programs could be carried out.

The Institute took part in the development of a PhD program in part of list of disciplines and the development of courses related to biodiversity conservation, sustainable forestry etc.

The Institute received a license from the Ministry of Education and Science of Ukraine to study PhD students in 2019. This should be regarded as a great achievement, given the research status of the Institute. According to the coordinator from the institute, there are very few research institutes in Ukraine that have a license to train PhD students, which is an advantage of the institute and can be used to strengthen the doctoral school.

There are restrictions on the recruitment of PhD students - 5 people per year. Considering the period of study, the total number of PhD students is 20 people. The

educational background of potential PhD students is Biology, which also limits the possibilities for recruiting PhD students. It should be recognized that the potential of the institute to implement programs both within the framework of the project and after its completion is relatively small.

The bottleneck is the mandatory accreditation of the doctoral program at the Ministry of Education and Science every 4 years, i.e., all formal points must be fulfilled. On the one hand, this is even good - there is a constant incentive to work well in order to extend accreditation. And even it is possible to receive albeit insignificant, but state budget financing of the program. On the other hand, for such a relatively small research institute, maintaining the competitiveness of the doctoral school and ensuring its sustainability is an ambitious task.

It should be noted that the institute does not have educational programs of 1 and 2 levels (bachelor's and master's degrees), which requires special efforts in the direction of attracting PhD students, i.e., competent marketing policy for the institute is an urgent need.

Currently, the institute cooperates with Ukrainian partner universities - Kharkiv and Odessa. Additional training courses have been agreed, which can be read by the staff of the institute for PhD students studying in Kharkov and Odessa.

The possibility of joint leadership of PhD students was discussed with Ukrainian partner universities. It is assumed that starting from the next academic year, PhD students may have 2 supervisors - 1 from the University of Kharkov or Odessa, and another 1 - from the Institute of Ecology of the Carpathians. The joint leadership of PhD students has a few organizational difficulties that need to be addressed as soon as possible. 50 academic hours per year are allocated for the supervising of a PhD student in Ukraine. The question is how to divide this professorial work among people working in different organizations and how to pay for it.

The Institute of Ecology of the Carpathians offers the following solution. To create a database of possible scientific advisers and consultants for PhD students, place it on the project website, after its finish - on the institute's website. No such base has been created yet. PhD student, using the base, can choose a second leader / consultant, depending on the topic of scientific research. The Institute of Ecology of the Carpathians signing a contract agreement with this supervisor, according to which pays for work. According to the contact person of the institute, many managers refuse to pay, since the amount is exceedingly small and the hassle with the tax and, in general, with the paperwork is greater than the benefits. At the same time, it should be noted that professors from the list of supervisors / consultants are interested in the implementation or management of scientific research by PhD students, i.e., the attractiveness of joint publications and fresh ideas in the professional field of

professors turns out to be high, and this stimulates the supervising of young researchers. This circumstance should be considered when developing further strategies to ensure the sustainability of PhD programs at the institute. The introduction of the institution of scientific volunteering can become a new initiative that contributes to the sustainability of the postPhD program and a good experience that can be transferred to other countries and institutions.

Due to Covid-2019, plans to share laboratory equipment for scientific research of PhD students were not implemented last academic year. It is possible that sharing of laboratory equipment (related to travel) will also be limited in the current academic year. Given the changed reality, partner universities should reconsider the creation and use of such laboratories. Assuming sharing of laboratory equipment.

Covid 2019 has changed the mobility of students and teachers. In the near future, there will be an acute issue of short and long trips to study disciplines and conduct research. It is necessary to provide measures that reduce the risks of the impact of pandemics on educational activities.

The Institute has close ties with regional universities, Ukrainian and foreign. Close ties can be used to attract PhD students. Already in the first half of 2021, the institute can send out letters that advertise the doctoral school, the benefits of PhD studies, etc. and thus recruit 5 PhD students. In the future, it is possible to conclude agreements with Ukrainian universities on joint PhD study and / or joint leadership of PhD students. This type of work requires organizational efforts on the part of the institute and is included in the work plan / marketing plan.

To attract PhD students, you can use scientific conferences, during which you can post information about the doctoral school on the stands or distribute flyers about the doctoral school along with the conference materials.

One of the best options would be to create a consortium of Ukrainian universities. It would include not only partner universities in the project, but also other Ukrainian universities. This issue needs to be worked out now, since such processes and procedures take quite a long time, and the project is already coming to an end, and the question of how to ensure the effectiveness and sustainability of the doctoral school becomes extremely acute and urgent.

The development of advertising materials may include not only flyers, but also videos on TV. The question should be worked out, maybe television is not the best option for attracting young people, YouTube or Tiktok may be much more useful.

**Odessa State Environmental University (OSENU)**

The university participated in the development of the doctoral program - a list of disciplines and their content. The university signed an agreement to establish a national doctoral school. This agreement, and the curriculum of the doctoral school are approved by the University Council.

Last year, 6 PhD students studied on the approved doctoral program, and the same number - this year. Odessa University supported the idea of joint supervising.

Odessa University is responsible for setting up a laboratory with the shared equipment of the doctoral school. The lab includes an online platform for monitoring hardware performance. Closer cooperation has been established with Kharkiv University in comparison with other Ukrainian universities, they constantly turn to the databases of hardware observations. Other universities do not contact us regarding the sharing of equipment and measurement results. We did not write, did not remind other partners, this is not our task.

The University teaches PhD students in two educational programs - Earth Sciences and Environmental sciences. It is easier for us to find PhD students in Environmental sciences, since the university teaches bachelors and masters for this program, but finding PhD students to study for the Earth Science program is more difficult. The university is ready to accept PhD students from other universities, both Ukrainian and foreign. At the same time, we cannot send our students to study at other universities. The number of students in general is decreasing, there are even fewer people willing to study for a doctoral program, so we cannot afford to send talented and motivated students.

The academic exchange of PhD students in the last academic year was not carried out: 1) there was not enough funding, 2) quarantine due to Covid-19. The main reason was, of course, quarantine. After the end of the project and as a result of the lack of funding for academic mobility of PhD students, financial difficulties will come to the fore. Thanks to quarantine, a variety of virtual activities have developed, and they are likely to remain a good alternative to travel and student exchange in the future.

Within the framework of the project, syllabuses on the disciplines of the curriculum have been developed for the Moodle platform. Not all these courses are in English yet, but in the future, from our point of view, these courses, combined with video conferencing, will replace academic mobility.

Joint supervising of PhD students is not encouraged by the Higher Attestation Commission of Ukraine. According to regulatory documents, only consulting is permissible. Joint supervising is only possible on a voluntary basis. Odessa University staff do not yet take part in such joint supervising, which is associated with a range of scientific problems and the specifics of scientific research, which differ from other partner universities. One PhD student from Lviv contacted us, if the interest in the joint supervising is preserved, then we can advise him.

The university has experience teaching foreign PhD students, from Vietnam. At least 5 PhD students from Vietnam have defended their dissertations and are currently living and working in their homeland. To attract Vietnamese PhD students, it is necessary to restore contacts, prepare letters and information materials, and constantly inform Vietnamese universities about the doctoral school at Odessa University.

We admit that the Ukrainian doctoral program may not be of interest to Vietnamese students since the list of disciplines is determined by national legislation and may not coincide. In this case, the solution may be the study of certain disciplines, for example, Academic writing, as well as remote consulting of scientific research or some part of them.

The university website contains information about the doctoral school and the procedure for joining it. In terms of the number of students admitted to the doctoral program annually, the university is limited by the requirements of the Ministry of Education of Ukraine. Currently, the annual intake of PhD students is 6 people. A small number of PhD students are associated with a small number of bachelors and masters. But the main reason is the desire to study at the doctoral school.

PhD students publish the results of their scientific research. The impact of the project and the doctoral school is currently difficult to assess since the publication cycle is quite long. It is not worth expecting an explosive growth in the number of publications. It is not only the results of scientific research, but also the time for writing high-quality articles, and the material costs for their publication.

Attracting PhD students to a doctoral school is possible in the following ways: 1) posting information on the university website (already done), 2) developing and distributing booklets or flyers, 3) mailing letters to partner universities. It should be noted that the potential of all the listed measures to attract PhD students is relatively low, because many current graduates are focused on doctoral programs in Poland.

**National University of Mongolia (NUM)**

My team consist of 5-6 persons. All of them are the staff of the university. Each person has a specific role in the project implementation, one is responsible for development of the MOOC courses, another one – for development e-courses, another one – for participation in the conferences and other project activities.

Our university has all types of the educational programs – bachelor, master and PhD programs. Under INTENCE project we updated our educational programs, after that we extended our updated programs among Mongolian and Vietnamese partners. We developed new e-courses and updated some from the existing also. Under INTENCE project our e-learning materials became more broader distribution in compare with previous time.

Now we have 3 PhD students enrolled into INTENCE doctoral school. I should say that the population in general and number of students in particular in Mongolia is quite small. And we don't expect that the number of enrolled in INTENCE doctoral school students will be very significant. I guess, the involving PhD student will be the main challenge after the INTECE ending. I expect, we will have 3-4 PhD students every year. We plan to change the duration of Ms and PhD national programs according "Russian style". That means 2 years of Ms program and then 2 year of PhD program, in sum 4 years. I think it will be very important step to support sustainability of the INTENCE doctoral school. One of the "risk" factors is the payment for the PhD program. In Mongolia the students, as a rule, pay for your own and not all graduated students would like to continue education. We think that the development of the full online doctoral program (not separate disciplines but program in the whole) can solve this issue. Covid-19 gives us the chance to look on the opportunity and success of such organizational form of doctoral program. So, just now we have 2 strategies to achieve the sustainability of INTENCE doctoral school in the future. We also have plans to convert even Ms and Bachelor programs into full online form.

Enrolling foreigner students also big challenge. If we want to invite students (not only PhD, but Ms and Bachelor) we need university website in English – all information should have English translation. And it is a big problem. Some general information about university you could find in English, but if you are going to enroll to some educational program at our university, there is not information in English.

In regards to INTENCE e-learning platform, our university has developed 7 e-courses. But most of educational materials in Mongolian. We use interactive form of communication at Moodle platform – we answer on students' questions, discuss the



educational materials, control and monitor their activities at e-learning platform. All developed courses were tested last academic year (2020-2021). We have very high interest from students' side to such form of the education.

We have national agreement between Mongolian universities on cooperation and co-supervising of PhD research. This agreement is open to other universities. Last month we asked University of Life science to join in our national Consortium. And we have prior consent from its side. It is very important for project sustainability in the future. We wrote down the list of the professors who can supervise PhD students in English. The list is not very long. Very easy find persons who can speak English, but it's very difficult to find persons who can teach in English.

We bought the lab equipment under INTENCE project. Due to Covid-19 we can't organize co-sharing and collaborative use of the equipment. Under national agreement of cooperation, we decided to organize Summer school in the next 3 year for graduated students. I think, it will be one of the ways of sharing and co-using our lab equipment.

We think that annual scientific conference at one of the INTENCE partner university will be the factor supporting sustainability of the project. Now we established annual research seminar (will be held in April or May). The professor and students could participate in this seminar and know better each other, discuss and organize collaborative research. This seminar could be online. In the August we will organize Summer school – it's also the factor of future sustainability.

## **Hanoi University of Science and Technology/TRUONG DAI HOC BACH KHOA HA NOI (HUST)**

Our university took part in the development of the teaching materials, design and development of the doctoral program, updated our bachelor and master programs. We look at the INTENCE project as an opportunity to improve quality of our educational programs firstly in Environmental engineering and Environmental management. We participated in all project activities under INTENCE. Unfortunately, Covid-19 given up all offline activities.

Our university has own PhD educational program. It exists more than 25 years. Usually, we have 5-7 PhD students per year. We expected that the similar number of PhD students will join to INTENCE doctoral school. We attract international PhD students, there are few of them. I think, that not only due to the distance between Vietnam and European

country, but the question of the scientific scholarly. Another issue of the involving of international students is the language.

We have national agreement on cooperation not only for project implementation but also for collaborative scientific research, training, and academic mobility. Every year we have workshop with participation of all Consortium members. Results of the workshop publish in the national scientific magazine.

Last year we had academic mobility and trainings only between Vietnamese universities. It is also this also applies to co-sharing of the laboratory equipment. We have the practice of co-supervising of PhD students.

We participated in the development of some e-courses. We hope, that the online and distance learning support sustainability of INTENCE doctoral programs.

### **Ho Chi Minh City University of Natural Resources and Environment (HCMUNRE)**

University is belonging to the Ministry of the Environment. And it was important to the university and the Ministry to be a part of the project because the project have a lot of actions to develop human resources in the sphere of Environment.

University took part in developing and designing of doctoral educational program. As other partner universities we had responsibilities to develop master and PhD programs. We do not have doctoral program at the university. We expected that during project we received experience, help and advice how to design and develop doctoral program. We had trainings how to develop syllabuses etc. and now we are ready to open doctoral study at the university. We have 4-year experience of master programs, not so much, so all teaching trainings we were useful for us.

This time our Ministry has changed the requirements for opening doctoral programs. Now for starting doctoral program university should have a scientific journal. We have responsibility to start doctoral school. And we are going to have PhD students in 2023. Now we have full capacity to open doctoral school: scientific journal, review of master program, and master students. Because you're allowed to open PhD program if you have bachelor and master programs. We had plans to open doctoral program this year, but it's impossible due to different reasons. I'm sure, that we will start PhD program in 2023, as I said before. We start doctoral school with 2 or 3 PhD students.

The INTENCE agreement was signed (all partners participated, the subject – cooperation with universities). In the beginning of the project, we had plans to exchange students, lecturers, co-use research equipment and so on. We have close cooperation with Hanoi university, and I personally hope, that Hanoi university support us in the opening of doctoral school. We sent our lecturers to Hanoi university to study teaching methodology, develop syllabuses.

Within project activities the Moodle platform was developed for e-learning. We developed courses and syllabuses for Moodle and sent them for reviewing and comments from other universities. We can use e-courses developed by partner university through Moodle. We have computer class for organizing e-learning. And all students, including students from foreign countries, not only Vietnam could join to studies. Our Ministry had allowed us to enroll only full-time students and lecturers for doctoral program. We need in more flexible mobility plan. May be PhD students should be not fixed in one country and spend every semester in different partner university. For example, Ukrainian university could be host university and student has advisor from this university, at the same time student could have co-advisor from Vietnam university or Estonian university and spend some time there.

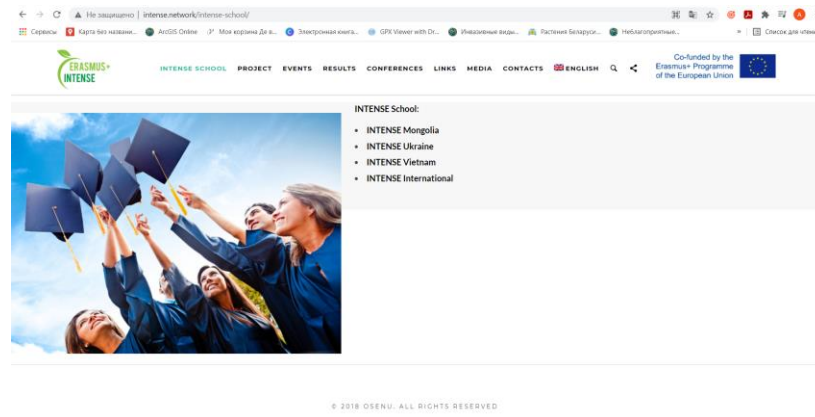
We developed profiles of our professors. Profiles are accessible at project webpage. If student has interest to sphere of scientific interests of professor, he or she can ask him about consultation or even supervision. If student would like to do research in Vietnam, he could come to the university, and we support him.

University has research lab. We have agreement to share equipment between partner universities.

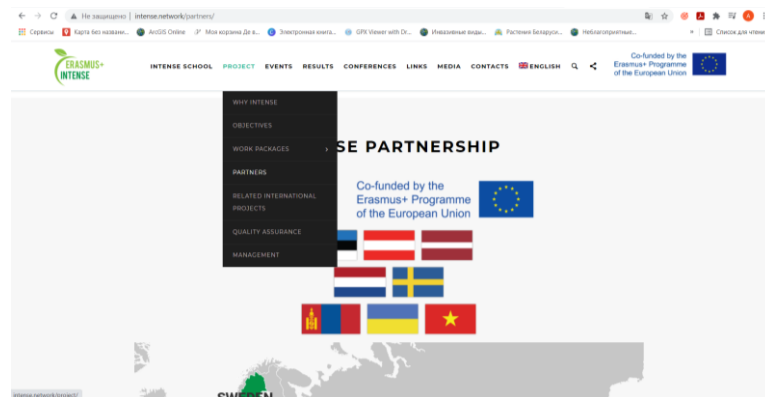
Some PhD research were interrupted due to Covid-19. I was looking for lecturers for our doctoral and master programs in other universities, but due to Covid-19 they did not come to us. Our country is awfully close, we are very afraid of Covid-19. So, e-learning only possibility to enroll foreign student to doctoral school. Covid-19 interrupted several project activities and stopped “live” communications. Now we start to communicate again; online communications, meetings and conferences were organized. In the future, e-learning and e-courses will support sustainability of the doctoral school. The main issue for e-learning now is the language, some materials are in English, but the most of supporting and lecture materials are in the national languages. It will take certain time to develop whole course completely in English, but we try to do this. We can start with common courses, for example, “Research methods and methodology”.

## Results of monitoring of website

Website of project has been developed <http://intense.network/intense-school/>. The website includes several tabs: About INTENCE, Project, Events, Results, Conferences, Links, Media, Contacts.

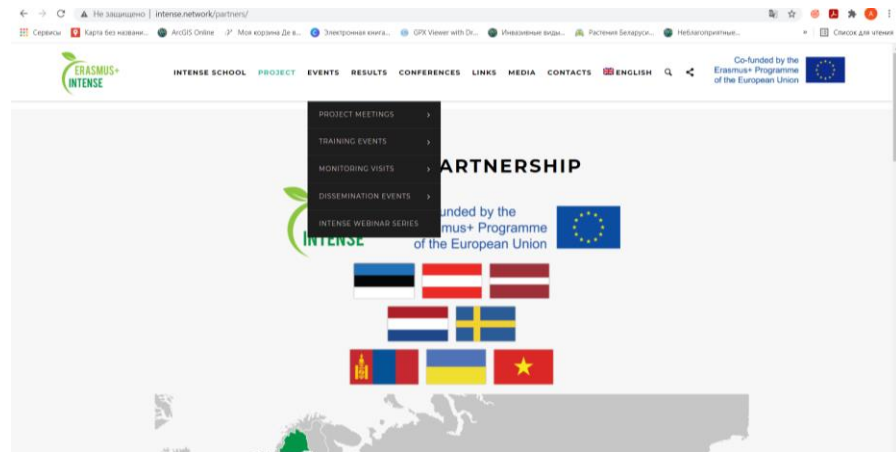


All partners universities have links on this website. The main page of the website represents the following information: objectives and work packages of the project, project partners and links with other international programs or projects, and operation information (project management and quality assurance).

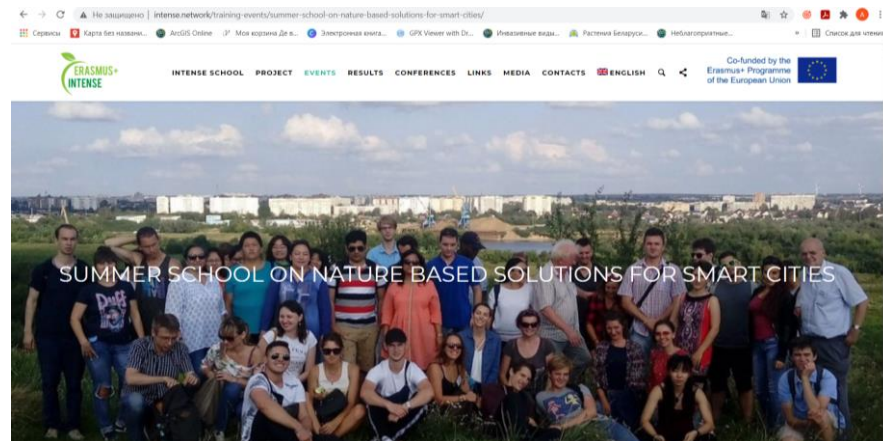


At the tab “Events” you could find information about project meetings, training events, monitoring visits, dissemination events and INTENCE webinar series.

## Implementation status of partner universities



It should be noted, that information about every event very detail and represent all full and deep information about project activities. For example, the tab on Summer school on nature-based solutions for smart cities has short description of the summer school and links on Agenda and schedule of the school:



At the tabs “Links” and “Media” you could find information about project activities in mass-media social networks and etc. This information is constantly updated and supplemented.

Some information is in national languages (Ukrainian, Mongolian, or Vietnamese), some in English. At this page you could find detailed description of doctoral school, duties and obligations of all partner universities, list of the involved academic staff, results of the project implementation, developed curriculum, ways of information dissemination among students of partner and other universities, developed syllabuses, description of equipment and experimental facilities, research themes etc.

Main results of the project were divided into following blocks:

INTENSE Surveys (Summary reports of the questionnaire survey for the integration of environmental policy, management, and technology training in doctoral education programs in Ukraine (in Ukrainian), Mongolia (in English) and Vietnam (in English));

INTENSE International and national schools. The tab has links on national (Ukrainian, Mongolian and Vietnamese) schools and International school. The most full information is about Mongolian doctor school (<http://intense.network/intense-school/intense-mn/>). Information is organized in several blocks: Codes of operational practice for Mongolia, National Agreement for Joint PhD Training (MN), MoU on the cooperation with the Mongolian University of Life Sciences on the INTENSE Doctoral School, INTENSE academic faculty in MN available for PhD and MSc supervision, Research training curricula, PhD students in Mongolia, Application procedure and contacts, Sustainability science workshop series, Equipment and experimental facilities available to share with INTENSE partners: National University of Mongolia and Khovd State University. Some information is in English, some – in Mongolian. The tab of Ukrainian doctor school includes: Information leaflet about the National Doctoral School (EN), How to apply: OSENU, KGNU, ICE, Research Framework (UA), Transitions Plan (UA), Agreement for Establishment of the National Doctoral School (UA), Codes of operational practice: OSENU, KGNU, Revision of PhD Passports (UA), Regulations of the National Doctoral School (in Ukrainian), INTENSE academic faculty in UA available for PhD and MSc supervision, PhD students in Ukraine, Equipment and experimental facilities available to share to INTENSE partners, Open science-policy online seminar series. The similar information you could find about Vietnamese doctor school.

INTENSE Institutional Arrangements (Codes of operational practice (OSENU, KGNU, Mongolia), materials for research frameworks, transition plans, model agreements, agreements on establishment of national INTENSE schools / networks, agreement on the establishment of INTENSE international INTENSE Research Framework). Code of practice was developed for the preparation of applicants of higher education degree of the Doctor of Philosophy at the university level. Code includes prerequisites and normative base at the state level, Conditions of the preparation of applicants of higher education degree of the Doctor of Philosophy at the university level, links to educational programs, Entry requirements, Conditions of the preparation and defense to receive the Doctor of Philosophy degree, Procedure of expertise and defense for obtaining a Doctor of Philosophy degree. At this tab you could find the research topics at partner universities, and agreement between partner universities on the organization international doctor school.

The next 3 tabs - INTENSE eLearning modules, INTENSE MOOCs, INTENSE e-Science - provide e-learning information – developed courses and disciplines and access to educational materials. Some materials in English, but a lot of information is in National languages. All e-learning educational modules have the similar structure: Syllabus, course presentation, accreditation document(s): the approved working program (a final accreditation), interim accreditation documents for course piloting, external reviews (national): praxis partner (1), praxis partner (2), external review (INTENSE), an internal QA summary, teaching and learning materials: lecture notes, link to e-learning. The fullness of the information in each course is differ and depends on the personal factors: who is responsible for the course and how this person (or team) organized work on the e-learning course. 4 MOOC-courses were developed: Water management and policies under the growing uncertainties in biophysical and socioeconomic systems, The precautionary principle and sustainability transition, Nature-based solutions and green-blue urban infrastructure, Integrative solutions for sustainable energy development (<http://intense.network/intense-moocs/>). The last tab - INTENSE e-Science provide common information and links on all e-materials of the project (<http://intense.network/results/deliverables-2/intense-e-science/>).

INTENSE Dissemination. The tab includes links on Brochures of national doctoral programs (schools) intense (only on Ukrainian), INTENCE dissemination strategy, leaflet, poster, banner, presentation template, certification.

Equipment and software acquired and deployed in the frame of INTENSE. The tab consists from the reports of partner universities about the use of equipment purchased under INTENCE project.

Equipment and experimental facilities available to INTENSE partners. This tab has information about laboratory equipment which could be used Master and PhD students for their research in the partner universities.

Publications (the tab has 2 links on published materials: Academic writing and presentation (in Ukrainian), and BOOK OF ABSTRACTS: Open Science Conference ‘Smart Green & Smart Blue: exploring nature-based solutions and ecosystem services approaches in environmental management, planning & policy’, Lviv, 7-9 November 2019 (In English).

Analysis of project web-site shown the transparency, availability, accountability (partly) of the project implementation. Site represents quite fully all project activities and all

deliverables achieved through project period. The web-site is the project strength and provide extremely important opportunity for project sustainability.



## Sustainability plan

### SWOT-analysis

Strength	Weakness
<p>Good co-operation between partner universities;</p> <p>Developed the project web-site and e-learning platform;</p> <p>Developed educational materials including - e-materials and MOOC courses;</p> <p>Approved INTENCE and national agreements of cooperation and the development of Doctor school;</p> <p>Established national consortium of Doctor school;</p> <p>Organized labs with co-sharing equipment;</p> <p>Established academic community for co-supervising of Master and PhD thesis and scientific research;</p> <p>Educational programs accredited by Educational ministries;</p> <p>Established scientific conferences, expertise for Summer school and other educational events organization;</p> <p>Published promoting project materials</p>	<p>Links between national universities stronger than between project consortium partners;</p> <p>Not all educational materials are presented in English;</p> <p>The lack of lecturers able to teach in English;</p> <p>The lack of students (from countries of partner universities) able to study in English;</p> <p>Lack of financing promoting materials and other measures of Dissemination strategy;</p> <p>Different state (national) obligatory requirements for Master and PhD educational programs;</p> <p>Strong competition for students and resources at national and even international levels;</p> <p>Lack of financial instruments for co-supervising Master and PhD thesis</p> <p>Significant remoteness of partners from each other</p>
Opportunities	Threats
<p>Further strengthening of cooperation between partner universities;</p> <p>Open consortium for other universities at the national and international levels;</p> <p>Further development of e-learning education;</p> <p>Supporting conferences and Summer schools in the future;</p> <p>Enroll students from other universities which do not have the accredited Master and PhD educational programs;</p> <p>Implementation the Dissemination strategy;</p> <p>Financing new project and initiatives from national and international Funds</p>	<p>Continuing pandemic of Covid-19, lockdowns and bans for travelling and off-line communications;</p> <p>Political situation in- and out- boarders of partner countries;</p> <p>Change of the rules and regulations from national educational Ministries;</p> <p>The low attractiveness of INTENCE doctoral school for external partners and students;</p> <p>Lack of financing International educational programs;</p> <p>Established by national Ministries of education assigned number of Master and PhD students;</p>

## Goals of Sustainability plan

Overall, sustainability of the INTENCE project means achieving and ensuring:

- an efficient and effective set of activities for boosting the number of enrolled Master and PhD students;
- continuous improvement and extensions of the educational content, e-learning tools and services taking into consideration their competitive environment and technological advancements;
- intensified interest as well as boosted motivation of the participating organisations to use, promote and further improve doctoral program and its governance.

Hence, the sustainability planning of the INTENCE project results will be performed at two parallel and complementary levels:

- Internally in the consortium organizations, i.e. through ensuring that all consortium participants will continue to use and expand the educational platform, e-learning materials and MOOC courses, co-sharing laboratory equipment, co-supervising Master and PhD students following the end of the project. To this end, all consortium partners that will act as end-users of the INTENCE project results intend to gradually involve more users in the INTENCE consortium.
- Externally through attracting and engaging third parties in the INTENCE doctoral school and educational programs. Such an engagement will be also part of the project's plans for the wider implementation of the INTENCE educational programs and e-platform.

Two approaches are considered for the INTENCE sustainability strategy: (a) viability at a mid-term level and (b) sustainability at a long-term level.

## Strategy for INTENCE project sustainability

A key aspect of the sustainability strategy involves the actions to be made for attracting and engaging Master and PhD students. The initial sustainability plan will include the following ones:

1. Strong involvement of students within the Consortium. The partner universities will comprise the initial pool of Master and PhD students for the INTENCE doctoral programs. Each one of partner universities has committed to disseminate the e-learning platform within their context and engage Master and PhD students in doctoral program during the project's lifetime. The successful enrolling students and use of the e-learning platform along with the internal dissemination activities to be held via presentations MOOC courses and e-learning educational materials under Doctoral program and information at the university's website and e-mail campaigns among others will further attract students. Partner universities will save the link to INTENCE web-page .

<b>Opportunities for Sustainability:</b>		
<b>Involvement of students within the Consortium</b>		
<b>Action steps</b>	<b>Who will implement</b>	<b>Timeline:</b>
Selection of laboratories, and educational programs to be initially targeted for students and researchers who could involve into INTENCE doctoral school	P5, P6, P7, P8, P9, P10, P11	Months 1-3 of project duration; Annual revision at September-October
Announcement of INTENCE doctoral school and e-learning platform at the university websites and through the university mailing lists	P5, P6, P7, P8, P9, P10, P11	1 <sup>st</sup> year of project duration; Revision and updating information annually in April-May
Publishing of promoting materials (leaflets) and regular distribution among students at partner universities	P5, P6, P7, P8, P9, P10, P11	2 <sup>nd</sup> year of project duration; Revision and updating information annually in March-April
Presentation of INTENCE doctoral school and e-learning platform for Bachelor students of targeted educational programs	P5, P6, P8, P9, P10, P11	Annually in April
Regular communication with partner	P5, P6, P7, P8, P9,	Constantly during project

universities for announcing project progress and INTENCE activities	P10, P11	implementation
Enroll Bachelor students into scientific researches, INTENCE activities (conferences, workshops, Summer schools and etc.)	P5, P6, P8, P9, P10, P11	Constantly
Collection of feedback from students, academic staff, and partners	P5, P6, P7, P8, P9, P10, P11	Constantly

2. Involvement of “external” Master and PhD students, expansion of the Consortium. The Consortium will exploit their scientific networks in order to disseminate the information about doctoral school and e-learning platform and attract more Master and PhD students. Initially, partners universities will attempt to attract students from their research networks. Gradually, the next plans will include broad dissemination activities held by the partners individually and the Consortium as a whole in order to increase awareness about doctoral school and e-learning platform and attract more students. This step is highly dependent on the dissemination and project activities and its success is strongly affected by their positive outcome. More specifically, the project activities will thoroughly present the targeted students’ group within the current and near future context. The dissemination activities will involve the preparation of a dissemination plan which will include the selection of the dissemination methods, the determination of the dissemination material to be prepared taking into consideration the targeted audiences, the selection of the events (conferences, workshops, etc.) to use for the dissemination purposes, etc. As the researchers and lecturers in the INTENCE Consortium are highly reputed scientists in their field of expertise, each one of them will be acting as research community leader in their domain. Hence, they will be actively participating in the project activities, including conferences, summer school and e-learning. With the effect of an influencer in their fields, their high activity/involvement is expected to trigger students into doctoral school and other universities – into Consortium.

Moreover, the INTENCE experts (researchers and lecturers) will be sending personalized emails to their research or university community members and collaborators throughout the project’s lifetime, notifying them about the project’s activities and the doctoral educational program status. Given that the purpose of the dissemination activities will be not only to raise awareness about INTENCE but also promote the project’s outputs and results to interested stakeholders and engage the research and university community, particular focus should be given on the preparation

of e-learning materials visualizing the project results and their expected benefits for students and academic staff. The latter could take place either through guided use of the e-learning platform and by inviting researchers and universities to join the INTENCE Consortium and use its laboratory equipment and e-learning platform for a specific period of time. The different regular forms of communication will allow for the incorporation of the group participants' feedback and ideas into the project's activities and implementation outcome and, hence, increase their commitment to cooperate with INTENCE Consortium. In order to maximize the sustainability potential of the INTENCE project and the outcome of the related activities, the INTENCE communication will be used for identifying the major influencers in a specific scientific area or field, so that the communication efforts are targeted and effective.

<b>Opportunities for Sustainability</b>		
<b>Involvement of external students and expansion of the Consortium</b>		
<b>Action steps</b>	<b>Who will implement</b>	<b>Timeline:</b>
Determination of specific scientific fields, potential partners (universities and research groups) to initially target at	P5, P6, P7, P8, P9, P10, P11	Months 1-3 of project duration; Annual revision at September-October
Preparation of a list of researchers, research groups, potential partner universities they will contact with based on the above fields	P5, P6, P7, P8, P9, P10, P11	Months 1-3 of project duration; Annual revision at September-October
Preparation of a list of stakeholders for each role in the INTENCE project who could serve as potential participants.	P5, P6, P7, P8, P9, P10, P11	Months 1-3 of project duration; Annual revision at September-October
Identify the major influencers in each one of the specific scientific fields and stakeholder group	P5, P6, P7, P8, P9, P10, P11	Months 1-3 of project duration; Annual revision at September-October
Decision for the communication channels to be used for contacting the external students, researchers and universities	P5, P6, P7, P8, P9, P10, P11	1 <sup>st</sup> year of project duration; Revision and updating information annually in March-April
Development of the dissemination	P5, P6, P7, P8, P9,	2 <sup>nd</sup> year of project

strategy	P10, P11	duration; Revision and updating information annually in March-April
Preparation of a template e-mail for the communication with the potential partners	P5, P6, P7, P8, P9, P10, P11	1 <sup>st</sup> year of project duration; Revision and updating information annually in March-April
Each partner contacts the potential users they have identified as well as the influencers in their specific scientific field	P5, P6, P7, P8, P9, P10, P11	Constantly
Personalized communication with the potential partners	P5, P6, P7, P8, P9, P10, P11	Constantly
Presentation of the INTENCE doctoral school to the external universities and potential partners	P5, P6, P7, P8, P9, P10, P11	During joint events
Inclusion of new partner universities into Consortium based on Agreement	P5, P6, P7, P8, P9, P10, P11	As an interested university emerges
Inclusion of the INTENCE link at websites of other potential participants of open consortium	P5, P6, P7, P8, P9, P10, P11	Constantly
Regular communication with potential partners for announcing project / doctoral school activities and e-learning platform updating	P5, P6, P7, P8, P9, P10, P11	Constantly
Distribution of project leaflets and brochures	P5, P6, P7, P8, P9, P10, P11	Constantly
Collection of feedback	P5, P6, P7, P8, P9, P10, P11	After join events
News announcements, invitations to join to events, distribution of the promoting materials based on the feedback submitted	P5, P6, P7, P8, P9, P10, P11	Constantly

3. Continuous improvement of the educational content. INTENCE consortium will continue to improve developed doctoral educational program through the development of the educational materials in English, uploading presentations, textbooks, reading and other supporting materials to the e-learning platform: following development of the MOOC courses and other tools for digital education. Partner universities will organize annual scientific

conference and at least one summer school for Master and PhD students with participation of the Consortium members and other research groups and universities. The established practice of scientific co-supervising will be used for increasing quality of students' research and publishing its results. In order to maximize the sustainability potential of the INTENCE project and the outcome of the related activities, the laboratory equipment will be used for collaborative research of Master and PhD students.

In order to ensure the financial viability of the INTENCE doctoral school and its continuous enhancement for purpose of competitiveness, the partners universities will be investigating different potential funding sources, including regional, national or EU programs, sponsorships by interested stakeholders, etc.

<b>Opportunities for Sustainability</b>		
<b>Improvement of the educational content of the doctoral program</b>		
<b>Action steps</b>	<b>Who will implement</b>	<b>Timeline:</b>
Regular revision and upgrading educational programs (including doctoral school program)	P5, P6, P7, P8, P9, P10, P11	1 <sup>st</sup> year of project duration; Revision and updating information annually in March-April
Regular revision and upgrading laboratory equipment	P5, P6, P7, P8, P9, P10, P11	1 <sup>st</sup> year of project duration; Revision and updating information annually in November-December
Improving language skills of the academic staff involved (directly or potentially) into INTENCE doctoral school	P5, P6, P7, P8, P9, P10, P11	Annually, 1 time during educational year
Supporting close scientific cooperation with partner universities through collaborative research, conferences and workshops	P5, P6, P7, P8, P9, P10, P11	Constantly
Supporting co-supervising of Ms and PhD students	P5, P6, P7, P8, P9, P10, P11	Constantly
Regular organization of conference and Summer school	P5, P6, P7, P8, P9, P10, P11	Annually, 1 conference and 1 Summer school at one of the member of Consortium

Conversion of the research results into scientific papers and published them	P5, P6, P7, P8, P9, P10, P11	Constantly
Development e-learning educational materials (including new MOOC courses) and uploading them into e-platform	P5, P6, P7, P8, P9, P10, P11	Constantly
Development of the online doctoral school program	P8, P9	During 2022-2023
Supporting access to e-learning platform for internal and external users	P5, P6, P7, P8, P9, P10, P11	Constantly
Monitoring of each user's activity in the e- platform (how often, for how long, which services)	P5, P6, P7, P8, P9, P10, P11	Constantly
Communication with the users based on their activity in the platform, announcements for new features to be included in the e-learning platform, etc.).	P5, P6, P7, P8, P9, P10, P11	Constantly
Development and use of the pool digital activities on the base of e-platform for further cooperation between partner universities and implementation of doctoral school	P5, P6, P7, P8, P9, P10, P11	Constantly
Accreditation of the doctoral school and obtaining official recognition from national educational authority	P5, P6, P7, P8, P9, P10, P11	Depends on National legislation
Investigating different potential funding sources for further supporting of doctoral school	P5, P6, P7, P8, P9, P10, P11	Constantly

### Regional focus of INTENCE project sustainability

Mongolian partner universities. Short video and leaflets about INTENCE doctoral school were developed and published. In the future partner universities will regular update, upload and distribute promoting materials among bachelor students. In the next 2022- and 2023-years NUM and Khovd are going to organize research seminar for bachelor, MS, and PhD students. Research seminar will be held one time per month during the educational year. In the 2022 Mongolian universities have plan to organize the Summer school. The



practice of joint supervision of Master and PhD students as well as joint research will be continued.

Universities continue to develop MOOCs and other e-courses, improve their content, and add all teaching and supporting materials to INTENCE e-learning platform. In the close future educational materials will be developed in Mongolian for attracting and enrolling first of all Mongolian students into INTENCE doctoral school.

NUM started the negotiations with national Educational ministry about possibility to develop and implement full-time online educational programs (Master and PhD). If such permission will be received, universities start online INTENCE doctoral school as soon as possible. It will allow to enroll more Mongolian students from all parts of the country and strength the INTENCE sustainability noticeably. In the case of the refusing the proposal, NUM and Khovd will continue hybrid form of doctoral school (partly online, partly offline). NUM and Khovd will open new educational program on Environmental management developed under INTENCE project. Universities are going to receive the accreditation from national Educational ministry in next 3 years.

There are few opportunities for expansion of established national Consortium. At 24<sup>th</sup> of April 2021 the agreement between national Consortium and Mongolian University of Life science (MULS) was achieved, and MULS became a part of the Consortium. It seems only opportunity for Consortium expansion in Mongolia, but in the future, it will be possible to involve other scientific and educational organizations from neighbor countries. NUM, Khovd and MULS will continue this work.

For attracting international students universities will develop step by step e-courses and MOOCs in English. In this and next educational years 2 seminars for academic staff will be organized. These seminars have goal to improve language skills of the lecturers and help them to develop teaching materials in English. For better results the teachers of English will be involved in the process.

For INTENCE sustainability NUM and Khovd are going to receive additional financial support. Partly, for organization Summer school in the next year will be used resources of URGENT project (Erasmus+). National fund supported SDG goal could provide budget for academic mobility within Mongolia. NUM has such experience this year and will use this financial opportunity in the future. Moreover, NUM developed project concept note and has preliminary agreement with Korean university to apply funding at Korean fund or USA funds

(if it will be possible) in 2022. Project proposal among other things will support doctoral school.

Ukrainian partner universities. Ukrainian universities have long-standing and strong ties with each other, and now they are a close-knit consortium with constant joint activities and collaborative research and teaching. 2 PhD students are co-supervised by professors from partner universities in this educational year. The number of co-advising PhD students in next 2 year will achieve 4-5. Moreover, Ukrainian universities involve professors from EU partner universities for teaching, researching, and supervising. This practice will be continued and approve project sustainability.

All Ukrainian partner university developed and approved all documents for doctoral school, and even more, all of them accredited by national Educational ministry. In the constellation of Ukrainian universities special point should be given to IECNASU: it received the accreditation of doctoral school in spite of the absence of bachelor students and strong scientific profile of the activity. The accreditation of the doctoral school will allow to get INTENCE sustainability in short- and long-period.

All information about doctoral school is available at the university web-sites, at the separate web-page, as well as at the web-page of the university department of PhD studies and department of international affairs. But at the least case this information in Ukrainian, and for attracting the international students to doctoral school it is necessary to present information about doctoral school in English too. Universities are going to upload description, rules and conditions for entry, pre-conditions and etc. in English in the closest time after agreement with Department of PhD studies and Department of the international Affairs.

Universities are going to make information about INTENCE doctoral school more visible and well-presented at their web-sites.

Ukrainian partner universities have already done a lot of efforts for expansion of national consortium. Till now they have agreement to join Consortium with 5 universities: (1) Lviv National University named after Ivan Franko, (2) Ternopil National Pedagogical University named after V. Hnatiuk, (3) Uman National University of Horticulture, (4) Kherson State University and (5) Vinnytsia Academy of Postgraduate Education. Some of mentioned above universities do not have accredited PhD educational programs and Consortium will give the opportunities for students continue education in INTENCE doctoral school, and, in the result, lead for INTENCE sustainability. Expansion of the Consortium will give possibilities for better use of co-sharing laboratory equipment purchased by INTENCE

project and conduct collaborative research. Universities (OSEN, KKNU and IECNASU) are going to involve as minimum 3 PhD students from Consortium to INTENCE doctoral school next educational year. It should be noted that Ukrainian universities have very strong personal ties. It allowed, from one hand, to extend Consortium, but from other hand to strength the sustainability through involving researcher and professors from other Ukrainian universities to teaching and co-supervising.

There are more than 20 e-courses (in the sum) were developed by Ukrainian universities under INTENCE project. All of them were uploaded to e-learning platform. Some of these e-courses are in English, some – in Ukrainian. For attracting international students to INTENCE doctoral school Ukrainian universities are going to add educational materials in English (step by step, depending on the lecturers' language skills). Different seminars and educational workshops for improving language skills will be helpful. In the 2022 universities are going to organize 1 "teaching" workshop on the syllabi development and improving language skills.

Universities have plans to continue joint events and are going to organize 1 joint scientific conference per year from 2022. Academic mobility within national Consortium will be organized on universities budget. Co-supervising PhD student will be organized on "hourly basis" from universities budget. Such financial instrument was developed and tested by IECNASU last year. Moreover, most of researchers and professors involving in co-supervising of INTENCE PhD students are agree to work even without payment (due to complicated bureaucratic procedure of such payment). The reasons: (1) opportunity to use new laboratory equipment, (2) actual topics of the research and (3) opportunity to publish research results in international scientific magazines. This strong interest to co-operate among researches will be supported by personal ties and collaborative work of established small "author" / research groups. Ukrainian universities started the discussion on the future project proposal, the implementation of which could indirectly support INTENCE doctoral school. Very likely, it will be Erasmus+ project.

Vietnamese universities started to work together under UNTENCE project and in the future need in more close cooperation and coordination within national project Consortium. HCMUNRE does not have PhD educational program, and its ambitions were to develop bachelor and master program during INTENCE projects. HCMUNRE developed all documents for starting new educational programs and is waiting for permission from national Educational ministry. Additional "bottleneck" factor that all documents should be approved by Environmental ministry too. One training for lecturers was organized last year in HUST, and

lecturers from HCMUNRE participated also. Should be noted that number of joint events should be increased as well as their variety. In 2021-2022 Vietnamese universities are going to held 1 webinar to staff on teaching methodology.

Vietnamese universities took part in the development of MOOCs courses and e-learning materials. They are going to continue this work in collaboration with other INTENCE partner universities. Due to very strict lockdown requirement due to Covid-19, universities are looking for opportunities for the development of the online educational program. Such program could involve to INTENCE doctoral school not only Vietnamese students, but international students also. Due to significant remoteness of the Vietnamese universities from the rest partner universities the attractiveness of the PhD research and studying at Vietnam is quite low, and online educational programs will be helpful in the supporting of the project sustainability.

Vietnamese universities are going to take part in the 11th International Forum on Green Technology and Management (IFGTM) Conference in 2021-2022. The universities look at this conference as an opportunity to promote INTENCE doctoral school and involve more participants into national Consortium. For better results, the promoting material of INTENCE doctoral school should be clear and visible presented at the conference, and universities should write down the list of potential partners (as universities as personalities) and plan communications with each of them during forum. The work for expansion of Consortium should be organized not only during conference, but also on the everyday "routine" base. Universities should develop the template of the invitation list with information about INTENCE doctoral school and benefits for participants in the October, 2021. After that universities should send such invitation letters to all potential partner within Vietnam before the end of 2021.

For sustainability of the INTENCE doctoral school, Vietnamese universities are going to apply funding from MONRE fund in 2021-2022.

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## Conclusions

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A sustainability plan is, in essence, a road map that lays a foundation for planning and action. It defines and illustrates an organizational philosophy toward sustainability through an established vision, goals, strategies, and metrics to improve doctoral school and its governance at the partner universities.

This Plan integrates strategies and practices that can provide near-term benefits for INTENCE doctoral school as well as tools for continual and long-term progress toward sustainability. The Plan provides a shared decision-making and problem-solving framework for sustainability of the INTENCE doctoral school at the partner universities. It is the logical first step for the partner universities that are serious about tangible and measurable long-term sustainability practices. The Plan was developed using a collaborative process of interviewing and surveying university staff and studying of the visible deliverables of INTENCE project. This process was designed to build off a platform of existing Consortium practices and work toward continuous improvement with regard to effectively managing educational programs (including doctoral school), use of laboratory equipment, development and support e-learning platform, other practices to achieve sustainability of INTENCE doctoral school.