Austrian Universities and the Sustainable Development Goals

Körfgan A¹, Glatz I¹, Maier S², Scherz M², Kreiner H², Passer A², Allerberger F³, Kromp-Kolb H¹, Stötter J¹

1 Institute of Geography, University of Innsbruck, 6020 Innsbruck, Austria
2 Working Group Sustainable Construction, Institute of Technology and Testing of Construction Materials, Graz University of Technology, 8010 Graz, Austria
3 Representative for all students involved in forum n, Austrian-wide students alliance for sustainability. Further involved: D Steinwender, L Schmalzl, S Preiml, J Hueter, A Göd
4 Center for Global Change and Sustainability, University of Life Sciences and Natural Resources, 1190 Vienna, Austria

stephan.maier@tugraz.at

Abstract. In 2015, the United Nations released the 2030 Agenda for Sustainable Development, adopted by 193 countries, containing 17 Sustainable Development Goals (SDGs). The goals address social as well as economic and environmental challenges in a holistic approach. Participating university members of the Alliance of Sustainable Universities in Austria (ANU), a cooperative work platform that promotes sustainable development at universities in Austria, picked up on this impulse by developing approaches for universities to address SDGs in research and education. The article presents the cooperative process of developing a project with the aim of supporting political decisions for SDG achievement, establishing the SDGs in research and education and intensifying collaboration between universities. Besides interactive workshops and methods to develop the project, a mapping supported the team to find well-established and also underrepresented SDGs in research at universities in Austria.

1. Introduction
The challenges of the 21st century, such as climate change or biodiversity losses, are of high complexity, requiring holistic approaches [1]. Here, the 17 Sustainable Development Goals (SDGs) with their 169 targets released as Agenda 2030 aim at all spheres of sustainable development including social, ecological and economic aspects.

In order to break down these goals to distinct implementation tools, a stakeholder integration on different levels is necessary. Political approaches evolved to be "siloed" in their respective corners of their spheres of action [2]. This also contributes to the problem that SDG achievement is still far away and often "blurred" through spill-over effects and other obstacles difficult to capture. Indicators are an important and helpful tool to measure progress, but it must be ensured that the appropriate criteria are applied. Scientific support is necessary to outline options that can be taken for SDG achievement and to critically reflect on SDGs and targets. Presumably, in some cases this will need the introduction of additional indicators to the ones applied so far.
The role of higher education institutions (HEIs) can be described as follows. As “change agents” HEIs drive forward sustainability through problem-oriented real-world research, critically reflect on goals, integrate sustainability into research and education and thus educate future decision makers. They can give scientific advice for decision-making through science-policy dialogues [3].

In Austria, universities are articulated to the performance agreements (German: Leistungsvereinbarungen) which each university contracts with the Austrian Ministry of Education, Science and Research every three years [4]. These performance agreements contain the basis for the content-related development and strategic profile formation of the universities. In the framework of the performance agreement period of the years 2016 to 2018 the Austrian Ministry additionally invited the universities to intensify their pioneering task for a sustainable and future-oriented development of society, environment and economy according to the Brundtland Report from 1987 [5] in order to engage with the increasing global challenges. Austrian universities as autonomous educational and scientific entities also create their own development plans where they explicitly concretize their profile formation and define their overall concepts including content like future development goals, strategic orientation and measures.

The project UniNEtZ (German: Universitäten und Nachhaltige Entwicklungsziele, Universities and Sustainable Development Goals) has been developed in order to support political agenda setting in Austria, to integrate sustainability into research and education and to strengthen collaboration between universities. The aims of UniNEtZ are summarized as follows:

- Development of a catalogue of options on how the SDG might be achieved in Austria, taking a systemic approach to achieve measures compatible with all SDGs
- Address SDGs in universities in research, teaching, life-long learning, responsible science and in university management
- Identify research needs and develop research projects across universities
- Create added value through cooperation and new combinations of knowledge
- Improve interdisciplinary co-operation within and between universities
- Interaction with stakeholders from politics, administration, economy and civil society
- Attempt at interaction with the “other 50%”, those people left behind, as socially vulnerable groups, e.g. long-term unemployed people)
- Build capacity amongst researchers, teachers and students regarding the issues addressed by the SDGs

2. Project development and methodological approaches

2.1. Project development
Since April 2017, several workshops have been launched in order to sharpen the project’s goals and develop the scope of the bottom-up initiative UniNEtZ. In a first impact-workshop in May 2017, participants from different universities and the Austrian Federal Ministry of Education, Science and Research (BMBWF) identified factors that stimulate a successful implementation of sustainability at universities and help to realize the planned project. According to the participants, there are several factors that are effective in supporting the operationalization of the further process on different levels (see Table 1). As driving variables, the group identified three factors: support by the Austrian federal government ministries, a central coordinating project management and an SDG mapping to identify research focus areas of the involved institutions.
Table 1. Success factors that help to achieve the defined goals of the UniNEtZ project. The factors were identified during a workshop in May 2017 with stakeholders from universities and Austrian ministries (Source: adapted from FASresearch 2017 [6]).

| Type of variable          | Success factors applied to UniNEtZ                                                                 |
|---------------------------|------------------------------------------------------------------------------------------------------|
| Drivers: preconditions and requirements for the process, lever in the initial project phase | • **Federal ministries**: support and interest of the political stakeholders involved              |
|                           | • **Project management**: central project management and coordination                                |
|                           | • **SDG Mapping**: identifying research strengths of the participating universities in order to orientate the further process accordingly and help to focus thematic fields |
| Make-or-break variables: necessary for the process | • **Clear target definition** of the project                                                        |
|                           | • **Innovation**: development of new knowledge and building of new cooperation                       |
|                           | • **Thematic focus** based on competencies and demands                                               |
| Outcome variables: indicators measuring if the defined goals are approached                      | • **Awareness-raising** at universities                                                             |
|                           | • **Network** of motivated people                                                                  |
|                           | • Integration into **tasks of the university**                                                      |
|                           | • Integration and interactions with other **societal stakeholders**                                 |
| Buffer variables: factors directly impacting the goal, must be clarified in advance, support the process | • **Resources**: financial incentive structures for the project support                             |
|                           | • **Interactions**: consider various interactions between SDGs, targets and indicators             |

Based on the identification of these factors, further workshops focused on sharpening the goals of UniNEtZ (see section 1) and developing the project framework were organized. Once the scope of the project had been outlined, the universities started to integrate the core ideas of the project into the performance agreements for 2019-2021 between universities and the BMBWF. The universities involved have been in a constant dialogue with each other and with the ministry in order to drive forward the implementation of the structural framework conditions of the project. By December 2018, the integration of UniNEtZ into the performance agreements was completed.

Parallel to the project development, information events helped to gain a clearer picture of the SDGs and related topics. For example, experts such as Keywan Riahi (IIASA) gave inputs on the role of universities in sustainability transformations during a workshop in June 2017. Further, the question of how interactions between scientific and societal fields could be strengthened was a core topic during the project development. Figure 1 shows the timeline of the project with a development phase, thematic focus setting and official start of working on SDG options.
In addition to the structural project development, intensive dialogues helped to integrate important stakeholders from the BMBWF into the process. Both, workshops and bilateral talks with respective stakeholders were held on a regular basis. During a presentation workshop in May 2018, the results of the SDG mapping (see section 2.2.) and the preliminary integration of the project UniNetZ into university structures at that point were presented and exchanged with stakeholders from the BMBWF, other ministries and the Federal Chancellery.

2.2. SDG Mapping
In order to support the process of finding focus areas for each university, an SDG mapping was conducted from September 2017 until February 2018 [7]. As a method a mapping tool was developed in an interdisciplinary process with a duration of about half a year. Data on publications and project activities from 13 universities were investigated according to SDG relation and thematic focus fields. In total, about 15,000 publications and 17,000 projects from the period 2013-2017 were extracted from the internal research documentation systems of the involved universities and made available for the mapping.

The mapping is based on a keyword catalogue, containing about 1,000 keywords in English and German. To develop this catalogue, the Agenda 2030 was screened for prevalent words as a first step. Synonyms were derived from these words in a semantic approach, and these were matched with keyword lists from other studies [8]. In an iterative process, these keywords were discussed with stakeholders from the partner universities and tested via the search tool. The tool is based on a Python script, which screens the available data for respective keywords and displays matches. Titles and abstracts of the available datasets were screened with the developed keyword catalogue, retrieving statistics on the distribution of the SDGs. These give an insight into the thematic focus areas of the universities.

It could be shown that some SDGs are “mainstreamed”, e.g. SDG 4 (Quality education), whereas other SDGs represent instead the niches covered by individual universities, e.g. SDG 3 (Good health and well-being). This also reflects the current participation of universities in UniNetZ.

2.3. Coordinators and contributors for the SDGs
Based on their previous activities, the universities decided to take roles as coordinators (in German SDG Leiter_innen) and/or contributors (in German Mitwirkende) for specific SDGs. These coordinative and contributing roles have been integrated into the performance agreements of each university. If a university is coordinator for a specific SDG, the responsible team coordinates all activities related to...
this SDG and gathers the inputs of the contributing universities. Contributing members help to gather expertise and knowledge in order to develop measures for determining how the SDGs can be realized in Austria. Both coordinators and contributors have very close involvement with the SDGs, their specific goals and indicators (see Figure 2). To date (03/2019) 19 coordinations and 58 contributions have been covered by the following universities and institutions including Alpen-Adria University Klagenfurt, Danube University Krems, Graz University of Technology, Johannes Kepler University Linz, Medical University of Innsbruck, Montanuniversität Leoben, Mozarteum University Salzburg, University of Applied Arts Vienna, University of Graz, University of Innsbruck, University of Music and Performing Arts Vienna, University of Music and Performing Arts Graz, University of Natural Resources and Life Sciences Vienna, and Paris Lodron University of Salzburg, University of Veterinary Medicine Vienna, Climate Change Centre Austria, Geological Survey of Austria and Central Institution for Meteorology and Geodynamics.

The mixed backgrounds and interdisciplinary setting of the project enables a synthesis of available expertise to approach the SDGs holistically. However, each specific SDG will not only be approached from different disciplinary backgrounds, but bridges and interdependencies to other SDGs will be considered as integral parts of the project with the aim of identifying synergies and trade-offs. These interdependencies will need to be viewed from the beginning of the project in order to develop holistic solutions and options for measures on how to implement SDGs.

Figure 2. First working session on the SDGs – brainstorming available expertise, definitions of the SDGs and its targets and related indicators (Source: Kernegger 2019)

2.4. Artistic formats
Artistic formats are integrated into the methodic scope of the project as a means of achieving innovative approaches for the SDGs and will continue to support a) thematic approaches towards the SDGs and b) communication with the public and different stakeholders. The official UniNetZ kick-off event 21st - 22nd January 2019 is an example of how artistic formats of the kind enable alternative approaches to the topic. In the scope of the event, students and associates of the University of Applied Arts Vienna prepared the format "Knife, Fork and Pen" that gave impulses for a creative brainstorming process on the SDGs during the lunch break (see Figure 3). “Knife, Fork and Pen” turned out to be a productivity-enhancing tool for elaborating the first contents during the kick-off meeting lunch break. The long dining tables were covered with paper tablecloths and divided according to the SDGs. An assigned seat number
on the table ensured a sound mix of people and ideas in the context of their thematic backgrounds. 8 to 10 people per SDG introduced and discussed contents and ideas during the first course of the meal. After the sounding of a gong the SDG was changed by assigning a new seat number. All the ideas and suggestions that were developed during the 3-course menu and the accompanying three discussion rounds were written down on the paper tablecloths. A project-internal working group will continue to foster such formats and support the project team with methodological innovations and communication approaches.

Figure 3. The kick-off event with its interactive lunch time session (left) and working groups (right) (Source: Ruiz Cruz 2019)

3. Structure and special aspects

3.1. Governance structure of UniNEiZ

The UniNEiZ project currently has the active involvement of 15 universities and three scientific institutions in an open consortium. This means more institutions can join the project at any time during the working process. By anchoring the project into the performance agreements between the universities and the BMBWF and the signing of a Memorandum of Understanding, the 18 institutions have committed themselves to implementing the objectives of the project within the next three years. UniNEiZ aims to (i) develop an options paper for the Government to achieve the SDG objectives, (ii) strengthen the networking of scientific institutions within Austria, and (iii) promote the anchoring of the principles of sustainability in research and education. The institutions involved are thus complying in this project with the demand of the BMBWF, which states that universities should take more responsibility for real-world problems and societal needs (Third Mission / Responsible Science).

Several different organizational units operate within the project, acting on a strategic or operational level (see Figure 4 and Table 2).
Table 2. Structure of the UniNEtZ project with the different organizational units acting on a strategic or operational level.

| Function                  | Description                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| UniNEtZ Council           | This committee takes strategic and financial decisions in the project. Each participating institution, including the group of students, has one vote. |
| UniNEtZ Steering Committee| This committee leads the project and is active on a strategic as well on an operative level. It consists of three persons.                      |
| UniNEtZ SDG Board         | This board works on methods and contents related to SDGs and possible options. Its members coordinate the activities for each SDG and guarantee the linking of all SDGs. Every SDG has one vote. |
| UniNEtZ SDG teams         | These SDG teams compile the options to fulfil the SDGs related to Austria-related challenges. Further, they consider interactions with other SDGs and abroad. |
| UniNEtZ coordination      | This level represents the operative central coordination of the project. It is the central contact point for all committees and members.            |
| UniNEtZ Scientific Advisory Board | This committee (to be set up) is composed of scientists, politicians and economists. It accompanies the project with scientific and strategic advice. |

3.2. Options to achieve the SDGs

Within the three years project duration, SDG-related options will be developed for how to contribute to achieving the SDGs in Austria. In this context, an option is supposed to be policy relevant but not prescriptive. Thus, no recommendations will be made, but the options will be presented to the
government as a support for decision-making processes. Every option must be assessed regarding synergies and trade-offs with other options, all targets and indicators. Option packages can possibly be identified to mitigate disadvantages and strengthen synergy effects. The scope of possible options is limited to solely those that lie within a political mandate for Austria; however, special care will be taken to include options that help reduce negative spill-over effects making the achievement of the SDGs more difficult in other countries, especially developing countries.

When developing an option, a scientific standard must be adhered to. This guarantees traceability, reproducibility and comparability. Within the project, there will be a specific working group to develop an adequate methodology (WG methodology). Further details will be outlined in the current months. One of the main goals of the WG is to develop a concept to merge the options of the different SDGs in a systemic model. To ensure a scientific standard, (i) an analysis of the actual situation and developments will be made on the basis of existing data and statistics. Here, it is important to critically illuminate the quality of the data and their relevance to the research question. (ii) Furthermore, a system analysis will be performed for the influencing factors considering different system limits. For this purpose, positive and negative feedback loops in the system (synergies and trade-offs) are given particular consideration. (iii) The solutions proposed so far in Austria and their effectiveness must be discussed. (iv) A literature and practice analysis of solutions implemented in other countries should be carried out. (v) Based on these steps, the systems diagram can be improved and will then serve to make sure no relevant leverage points yielding additional groups of options have been overlooked.

3.3. Students – partners on equal terms

There is no doubt that students are the biggest stakeholder group at universities. The most important responsibility of universities is to enable students to strengthen their reflective faculty and that teachers and students jointly work together in order to develop contemporary action knowledge [9]. Hence, if HEIs intend to act as change agents in a credible manner and thereby attempt to foster a transformation towards sustainability, it is crucial to open up a space for a collaboration with students, where they are seen as partners on equal terms.

Within UniNEtZ, such an involvement is taken seriously as a main concern and was discussed in particular at the kick-off event in January 2019 by a working group consisting of students and professors of various universities. It was decided that students will be formally represented by the student association forum n. Founded in November 2018, forum n aims at building up an Austrian-wide network of student initiatives and individuals in the context of sustainability. In doing so, forum n is contributing to the development of a sustainable and thus future-orientated higher education landscape in Austria. The forum n is part of the UniNEtZ Council (Figure 4) with the same voting right as all the other universities. Besides this structural embeddedness on eyelevel, students have the possibility to contribute to any SDG they are interested in, whereby a particular focus is on SDG 4 – Quality Education. Hence, UniNEtZ is an important platform for students to participate in an interdisciplinary dialog with scientists from different universities and disciplines. Furthermore financial support is also granted to facilitate the involvement of students, e.g. at UniNEtZ-events (e.g. meetings of SDG groups), and to enable them to set up their own projects related to UniNEtZ. An eyelevel collaboration of this kind recognizes that students can act as crucial change agents and multipliers not only at their universities, but also in their societal environment during their studies and beyond as future decision makers. The structures and “modi of collaborations” which will be implemented within UniNEtZ can serve as basis for how a continuous and long-term cooperation of forum n and the Alliance of Sustainable Universities in Austria can be realized. In this sense, the “eyelevel approach” of UniNEtZ can also serve as a best role model for other networks or projects where students should be involved as partners on equal terms.

3.4. Ethical aspects and guiding principles

Agenda 2030 and its SDGs can be understood as a global effort to overcome the challenges originating from the Anthropocene and its multiple and complex processes of change. There is wide agreement that
this is no longer a simple interplay of action and impact on the challenge side and reaction and adaptation on the response side. Thus, solutions which have been successful for quite some time are also no longer adequate as they miss the complexity and the, both spatially and temporally, multi-scale character of the challenges.

As a consequence, there is an ever-growing understanding that this challenging situation, which might even be seen as a key question for the survival of the human-environment Earth system as a whole, can only be mastered by a comprehensive socio-ecological transformation. Transformation means not purely addressing the challenges but reflecting on and rethinking of the value system on all scales [10], from the individual to group and societal level, which is seen as a key driver of all human activities [11]. Only when addressing these ethical aspects, can the systems at risk be transformed.

Within this value system sustainable development respectively the SDGs may be seen as the guiding pole star. That does not mean that SDGS, targets and indicators are applied and investigated, uncritically. On the contrary, they are brought into question, evaluated according to ethical principles and, as a result, further applied or discarded.

Against this background, the UniNEtZ consortium is fully aware that ethical aspects must be guiding principles of all research activities within the project. By doing so, the consortium is not only contributing to the idea of responsible science but in a further sense is making it become a reality. All in all, UniNEtZ can be characterized as a value based and society-oriented project by which the 18 contributing institutions show their willingness and potential in the newly arising field, the purpose of a University’s Third Mission in order to address societal and economic challenges within the cultural-environmental sphere.

4. Excerpt of first results

In this section we present an excerpt of first results within the ongoing UniNEtZ project. The networking and exchange of information between the participating universities is already taking place on a comprehensive scale. Through numerous workshops within each SDG, the first necessary steps have been taken to meet the requirements of the UniNEtZ project. It is interesting to observe how different ideas and approaches within the individual SDG groups are discussed, brought together and implemented.

As already mentioned, one of the crucial tasks of the project is the systemic consideration of interdependencies among all developed options in order to holistically identify synergies and trade-offs. For this reason, a 2-day workshop has already been held under the title "Systemic approach for a holistic consideration of options". In the course of this workshop, the participants were introduced to the basics of system dynamics and the modeling language. Finally, attempts were also made to develop systemic interdependencies within selected SDGs, with a focus on the correct application of the modeling language. Figure 5 shows some impressions from the workshop where a systemic approach was applied to the exemplarily selected topics “waste” and “education”. Systemic interdependencies as well as impacts were related to these topics.
Another ongoing activity is the continuous involvement of students in the SDG topic as well as in the UniNEiZ project. As an example here, a master's thesis, which has already been completed, can be mentioned. The topic of the thesis was the investigation of the systemic approaches' application within SDGs in the last years and the identification of relevant fields of action in the field of sustainable construction. Another positive aspect is the interest and willingness of students to present and disseminate the contents of their master's theses at conferences (e.g. SBE19 or ENOVA19).

5. Conclusion and Outlook

By setting the structure for collaborative work between the participating institutions, the framework conditions for working on options for how to achieve the SDGs has been laid. There is solid expertise available to work on the SDGs. During the next months, the team will work towards a first report, outlining the methodological approaches in developing measures for how to achieve the SDGs and giving examples of options. Following the identification of the research strengths a first step has been taken on working in a more targeted manner on the SDGs. In order to fill existing gaps, expertise will be further extended in the near future by involving further stakeholders and partners. Appropriate methods and communication formats on how to involve these stakeholders will be developed.

One important group to be addressed is that of the students, as drivers of sustainability, change agents and future decision makers [12-13]. In order to integrate sustainability into higher education, investigating which topics and approaches are already contained in university curricula can help to focus the agenda more towards sustainability issues and real-problem based education and research.

Figure 5: Application of a systemic approach within exemplary topics (Source: Working Group Sustainable Construction Graz University of Technology 2019)
References

[1] Pradhan P, Costa L, Rybski D, Lucht W, Kropp, JP A 2017 Systematic Study of Sustainable Development Goal (SDG) Interactions *Earth’s Future* 5 1169–1179.

[2] Obersteiner M, Walsh B, Frank S, Havlík P, Cantele M, Liu J, Palazzo A, Herrero M, Lu Y, Mosnier A et al. 2016 Assessing the land resource-food price nexus of the Sustainable Development Goals *Sci. Adv.* 2 e1501499.

[3] Stephens JC, Hernandez ME, Román M, Graham AC, Scholz RW 2008 Higher education as a change agent for sustainability in different cultures and contexts. *Int. J. Sustain. Higher Educ.* 9 317–338.

[4] Austrian Federal Ministry, Bundesministerium 2016 *Leistungsvereinbarungen 2016-2018.*

[5] World Commission on Environment and Development 1987 *Our Common Future*. Oxford: Oxford University Press. p. 27. ISBN 019282080X, http://www.un-documents.net/wced-ocf.htm.

[6] FASResearch 2017 *SDGs an die Universitäten bringen. Die Ergebnisse des Impact-Workshops vom 18.05.2017* (Wien: FASResearch).

[7] Körfgen A, Förster K, Glatz I, Maier S, Becsi B, Meyer A, Kromp-Kolb H, Stötter J 2018 It’s a hit! Mapping austrian research contributions to the sustainable development goals *Sustainability* 10 9 3295.

[8] SDSN Australia/Pacific 2017 *Getting started with the sdgs in universities: a guide for universities, higher education institutions, and the academic sector* (Melbourne: SDSN Australia/Pacific).

[9] Vogt M 2018 *Grenzen der Harmonie. Zur Spannung zwischen Freiheit und Verantwortung.* Keynote at SISI-Symposium (Sustainability in Science) Bundesministeriums für Bildung und Forschung an der Ludwig-Maximilians-Universität München 2018-07-17.

[10] SDG Academy, Planetary Boundaries and Human Opportunities, https://sdgacademy.org/course/planetary-boundaries-human-opportunities/, Last accessed on 15/03/2019.

[11] Educational web to the Anthropocene, http://www.anthropocene.info/global-goals.php, Last accessed on 15/03/2019.

[12] Vaughter P 2018 *Beacons, not towers: how higher education can help achieve the sustainable development goals* UNU-IAS Policy Brief Series (Tokyo: United Nations University).

[13] Stephens JC, Herandez ME, Román M, Graham AC, Scholz RW 2008 Higher education as a change agent for sustainability in different cultures and contexts. *Int. J. Sustain. Higher Educ.* 9 pp 317-338.

Acknowledgments
Special thanks to the great cooperation with all of the universities involved in UniNEtZ and to the Austrian Federal Ministry of Education, Science and Research (BMBWF) for supporting the project.