



AGENCY FOR
MOBILITY AND
EU PROGRAMMES



Erasmus+



VET4BioECONOMY

„Innovative VET for key competences in the emerging
field of forest bioeconomy VET4BioEconomy“

Report on existing VET programmes on forest
bioeconomy

Content:

Introduction.....	3
About the project and a research	3
Methodology	3
Defined relevant topics towards forest based bioeconomy and questions	4
1. The relevance of forest based bioeconomy topics and its presence in existing VET	6
1.1. Research conducted in Croatia.....	6
1.1.1. Introduction.....	6
1.1.2. Results – data	7
1.1.3. Explanation of results.....	8
1.2. Research conducted in Slovenia.....	8
1.2.1. Introduction.....	8
1.2.2. Results – data	10
1.2.3. Explanation of results.....	11
1.3. Research conducted in Austria.....	11
1.3.1. Introduction.....	11
1.3.2. Results – data	12
1.3.3. Explanation of results.....	13
1.4. The overview of results regarding topics' coverage.....	14
1.1. The overview of results regarding topics' relevance	16
1.2. Conclusion and recommendation	17
2. The overview of good practice examples.....	Pogreška! Knjižna oznaka nije definirana.
3. The overview of good practice examples.....	18
3.1. Introduction.....	18
3.2. Good practice example 1: Innovations in Bioeconomy	18
3.3. Good practice example 2: Biobased Products for a Sustainable (Bio)economy	19
3.4. Good practice example 3: Opportunities to replace fossil fuels	20
3.5. Good practice example 4: Boosting Bioeconomy Knowledge in Schools	21
3.6. Good practice example 4: Future Farms	22
3.7. Good practice example 6: Advanced Forestprofessional Course	23
4. Conclusion	25

Introduction

Even though forest bioeconomy becomes one of the guiding paradigms for the forest-based sector, and is of strategic importance for EU and partner countries: Croatia, Slovenia and Austria, there is a lack of educational opportunities in VET and lifelong learning for this topic.

The Erasmus+ project “Innovative VET for key competences in the emerging field of forest bioeconomy - VET4BioEconomy” aims in increasing the knowledge and provide key competences in forest bioeconomy to forestry related professionals. It will result in multilingual e-course on forest bioeconomy.

This report presents results of a research on existing VET programs on forest bioeconomy with an objective to provide inputs for creating a curriculum for this new e-course.

Report consists of two main parts:

1. Report on the relevance of forest bioeconomy topics and its presence in existing VET
2. The overview of good practice examples

About the project and a research

VET4BioEconomy will offer a unique forest based bioeconomy curriculum and e-course, which will ensure comprehensive content for knowledge and key competences in forest based bioeconomy for wider forest based bioeconomy stakeholders, and be in line with the policy priorities defined in the EU strategies. Multimedia e-learning content will be freely available in English, Croatian, German and Slovenian language and will provide good practice examples for bio-economy management, from sustainable wood resources management to high value products and services.

The project coordinator is Croatian Forest Research Institute, while partners are: Institute for development and international cooperation - IRMO and Algebra University College from Croatia, Slovenian Forest Institute, Slovenia Forest Service, Austrian Research Centre for Forests and University of Natural Resources and Life Sciences from Austria. The project duration is three years project budget is 196.378 EUR, financed under Erasmus+ program.

This project was initiated by the project consortium of successfully finished Erasmus+ project “Cooperation for innovative approach in sustainable forest management training – CIA4SFM”. In CIA2SFM project, we have collected data on existing topics related to sustainable forest management (SFM). In this project, we are focused on recognizing whether these topics contribute to bioeconomy oriented education, or are focused only on some parts of a traditional value chain management (VCM).

When we started designing a research process in VET4BioEconomy project, we firstly analyzed:

- 1) Are there in existing programs (collected data from CIA2SFM) examples where students learn about the whole VCM: from SFM to value added products and services?
- 2) Since our data are from 2014, we need to check if there are new VET programs that provide focus on forest based bioeconomy and to include finding in a country report.

Then we realized that new approach has to be developed, since we needed to define in more detail what forest based bioeconomy means to us, project partners and then to conduct completely new research fully adapted to topics specific for contributing to bioeconomy oriented education.

Methodology

This research was conducted in following steps:

1. Creating guidance for the research process

2. Defining relevant topics towards forest bioeconomy.
3. Finalizing a questioner
4. Defining target groups' scope
5. Conducting survey: data collection by interviewing target groups representatives.
6. Identifying good practice examples for forest based bioeconomy trainings.
7. Analyzing collected data and writing national reports
8. Writing comprehensive project report

Defined relevant topics towards forest based bioeconomy and questions

Please, estimate the coverage of relevant topics in an existing programme (5 Very Good, 4 Good, 3 Acceptable, 2 Poor, 1 Very Poor, 0 Not at all)
1. Forest management and economy of harvesting– importance of SFM in the whole value chain of forest bioeconomy, from traditional SFM towards interdisciplinary, forest bioeconomy oriented SFM-how to change management planning in order to produce various and added value products
2. From traditional value chain management (harvesting, logistic and wood products) towards new value chains (textile, food, pharmacy, chemistry, biofuels, circular economy, cascade use low quality wood usage, small diameter tree usage....)
3. Interdisciplinary approach in development of new products: forestry, wood processing, chemistry, design, construction, energy, food, marketing....
4. Circular economy /cascade use – recycling of technology waste, reuse of old wood products
5. Energy from biomass – new technology to refine biomass into bio-gas, pyrolysis oil, bio-coal
6. Construction – solutions for building and interior design (decrease carbon footprint and increase people's wellbeing)
7. Pharmacy – usage of agents derived from forest products (betulin, sterol, xyylitol etc.) for healthy products
8. Business – new opportunities for rural development
9. Wood products - new products - i.e. flexible screens made of Nano cellulose, intelligent wood packaging, biodegradable packaging materials, paints with natural oil, cosmetics with wild berries, etc... - other non-wood forest products – i.e. diversity of usage in pharmaceutical and cosmetic industry
10. Food production – new consumer trends, i.e. production of organic food from non- wood forest products, functional food, local production, new business opportunities,
11. Applications of forest materials in food (additives, cellulose gum as yogurt thickening agent, flavours)
12. Forest biomass/bio-based raw materials – application of chemistry, biochemistry and processes in handling biomass
13. Potential limitation in context of climate change (increment in cutting vs. limitation)
14. Ecosystem services – i.e. green care activities, recreational and touristic offer
15. Policy – the inclusion of forest bioeconomy in policy documents on national/EU/UN level (overview), funding possibilities (Austrian Ministry is preparing strategic document in February)
16. What is contribution of forestry to the economy on national/EU level, which role it has and how can it contribute
17. Good practice examples-case studies-Examples on country level and wider (i.e. circular economy examples, designed furniture, new innovative solution for use of broadleaves, healthy skin care, etc)
Comments: some more information, i.e. Name of the programme, for how long it exists?
Please, choose three most important topics, out of 17 listed or some new you want to add
1. choice
2. choice
3. choice
Do you want to add a topic that was not listed, but you find it very important? Please insert:

1. The relevance of forest based bioeconomy topics and its presence in existing VET

1.1. Research conducted in Croatia

1.1.1. Introduction

Croatian project partners CFRI and IRMO selected education providers focused on a criteria of interdisciplinary nature of bioeconomy. As recognized in preliminary desk research, potential for exploiting forest-based bioeconomy goes beyond merely the field of forestry. Therefore, following eight institutions were identified and included in a process of a research:

- Faculty of Forestry
- Croatian Chamber of Forestry and Wood Technology Engineers
- Croatian Agriculture and Forestry Advisory Service
- Faculty of Architecture
- Faculty of Agriculture
- Faculty of Design
- Faculty of Civil Engineering
- Faculty of Food Technology and Biotechnology
- Faculty of Mechanical Engineering and Naval Architecture (FSB/FAMENA)

Alltogether, there were 13 interviewees. The interviews were conducted with institutions representatives who were well informed with study programs, with more insight of specific program and its curriculum. Therefore, the collected answers highly depended on the personal estimation of the person interviewed, according to his or her expectation of the level of the topic presence in a curriculum and a level of how well a person is informed on other curriculums in their institution.

Desk research results show that secondary education does not have the bioeconomy represented in the program, according to vocational schools' curriculum and programs available on web pages of Ministry of Science and Education and National Center for External Evaluation Education.

1.1.2. Results – data

Bioeconomy topics present in current VET curricula



1.1.3. Explanation of results

Even though results do not include all institutions that provide HE, VET and LLL programs, and even though participants were chosen due to their involvement in specific forest based biotechnology topic, we can summaries results as follows:

The most covered topic in Croatian existing curricula of forest topics are topics:

- 4. Circular economy /cascade use – recycling of technology waste, reuse of old wood products
- 13. Potential limitation in context of climate change (increment in cutting vs. limitation)
- 3. Interdisciplinary approach in development of new products: forestry, wood processing, chemistry, design, construction, energy, food, marketing....

42%, 38% and 33% of participants marked that above topic are covered very good or good, consecutively.

The least covered topics are:

- 10. Food production – new consumer trends, i.e. production of organic food from non wood forest products, functional food, local production, new business opportunities,
- 11. Applications of forest materials in food (additives, cellulose gum as yogurt thickening agent, flavors)
- 12. Forest biomass/bio-based raw materials – application of chemistry, biochemistry and processes in handling biomass

91 %, 91% and 90% of participants marked that above topic are not covered at all, very poor or poorly covered, consecutively.

Only two of the participants in the study proposed additional relevant topic as the answer to the question: “Do you want to add a topic that was not listed, but you find it very important?”, and here are the answers:

- Biofuels / Bioproducts - biochemicals, biomaterials
- Forest Concessions.

Therefore, we can conclude that initial list of topics include most of the relevant topics of forest based bioeconomy for our target group.

1.2. Research conducted in Slovenia

1.2.1. Introduction

Slovenian project partners SFI and SFS first prepared a list of education providers in forestry. Identification of institutions was carried out through the Catalog of Qualifications System in the field of forestry and wood technology, which was prepared by Institute of the Republic of Slovenia for Vocational Education and Training. The catalog covers all qualifications and qualification providers in the field of forestry and wood technology. So, we identified 6 institutions:

- Srednja gozdarska in lesarska šola Postojna/Secondary forestry and wood school Postojna
- Srednja lesarska in gozdarska šola Maribor/Secondary school for Wood processing, Forestry and Design, Maribor
- Višja strokovna šola Postojna/Vocational College Postojna
- Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za gozdarstvo in obnovljive gozdne vire/University of Ljubljana, Biotechnical Faculty, Department of Forestry
- Grm Novo mesto - center biotehnike in turizma/Grm Novo mesto - Center of Biotechnology and Tourism
- B&B izobraževanje in usposabljanje d.o.o./B&B Education and Training d.o.o.

After identification we contacted them, talked with them about their educational processes and inquired about bioeconomy topics in the existing curriculum. The interviewees evaluated individual themes by completing the table. Assessments on the implementation of bioeconomy topics in current VET curricula are largely dependent on an interviewee and its criticality to the program being implemented at their institution. Therefore, estimates can slightly deviate from the actual situation. The collected data was then analyzed and summarized in the report.

In education (especially high school), there are national programs that provide for the content that students have to conquer. Therefore, there is not a lot of maneuvering space for newer and innovative content. Even more, the curriculum is very slowly updated. On the other hand, in adult education lecturers have more free hands for presenting good practice examples and introducing new studies but this is not done to a sufficient extent.

1.2.2. Results – data

Bioeconomy topics present in current VET curricula



1.2.3. Explanation of results

The most covered topic in Slovenian existing curricula of forest topics is topic 1: Forest management and economy of harvesting– importance of SFM in the whole value chain of forest bioeconomy, from traditional SFM towards interdisciplinary, forest bioeconomy oriented SFM - how to change management planning in order to produce various and added value products. 83% of participants marked that this topic is covered good (33%) or very good (50%) and 17% as acceptable. Second most covered topic is 13: Potential limitation in context of climate change (increment in cutting vs. limitation). 50% of participants marked that this topic is covered very well (50%) and 50% as acceptable. Topic 14: Ecosystem services – i.e. green care activities, recreational and touristic offer is also covered very well among Slovenian existing curricula. 83% of participants marked that this topic is covered well (50%) or very good (33%).

The least covered topic is 7: Pharmacy – usage of agents derived from forest products (betulin, sterol, xylitol etc.) for healthy products. 83% of participants marked that this topic is not covered at all and 17% as very poor. Topic 11 (Applications of forest materials in food (additives, cellulose gum as yogurt thickening agent, flavors)) is the second worse covered topic. 67% of participants marked that this topic is not covered at all and 17% of interviewees mean that it is covered very poor. Topics 6, 9 and 10 are also covered badly. This is understandable because these topics are quite new, and they require a lot of pre-knowledge to be understandable. They are too heavy for high school programs. On the other hand, they are very slowly appearing at the university level.

Some of the topics are actually devoted to programs from the wood profession (construction, energy from biomass, furniture design) and the forestry does not cover this, so it seems that at national level the topics are poorly covered, but they can also be found in other educational programs that were not included in the survey.

1.3. Research conducted in Austria

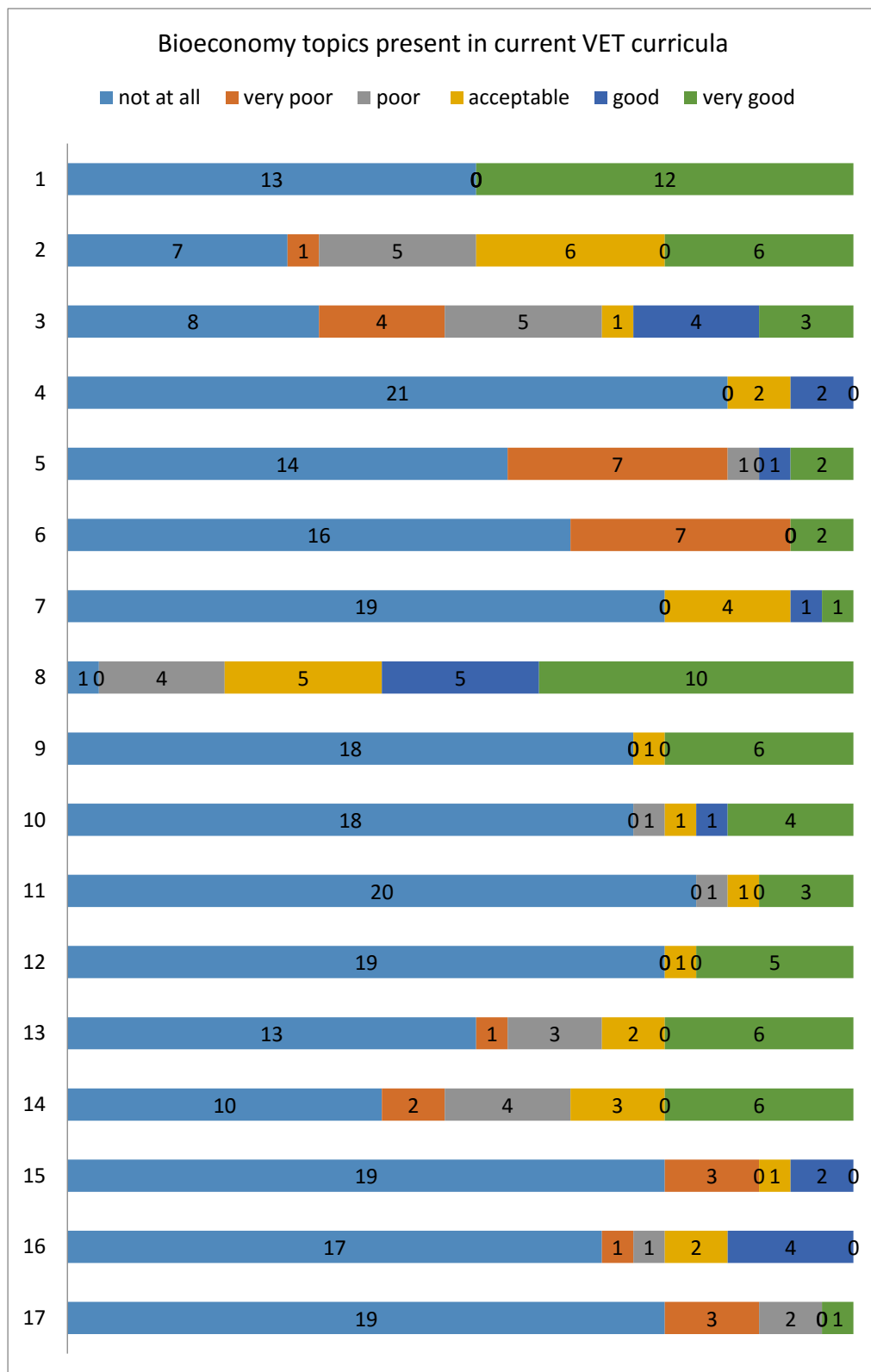
1.3.1. Introduction

Most (forestal) VET programs, besides University and High School curricula are organized by the three FASTs. At the Moment, great effort is taken to have a consistent education for certified forest trainings. This is crucial to have the same level of expertise from all graduates of different training centers. The necessary learning outcomes for this purpose are predefined by the Austrian chambers for agriculture.

When it comes to different approaches to the traditional value chain, more alternative approaches in marketing, sales, non-wood products or e.g. forest pedagogy few courses and trainings do already exist but still there is plenty of room for improvement. In the number of courses, as well as in the provided content and the methodology used to procure certain competence. For example, a mix of online lectures to provide basic theoretical knowledge in combination with important practical training on-site to acquire the skills.

Forest owners, as well as forest professionals from all different levels of education often lack certain social and communication skills. But these are often needed to be able to better deal with nowadays challenges. This resulting in a need for lectures tackling these particular issues. It might also be of interest to develop some kind of introduction to certain courses, in which participants could test their attitude towards particular topics to see if they have the prerequisite.

1.3.2. Results – data



1.3.3. Explanation of results

In VET trainings, done by FASTs and LFI 12 out of 25 (48%) of all courses cover the topic no.1: Forest management and economy of harvesting “very good”.

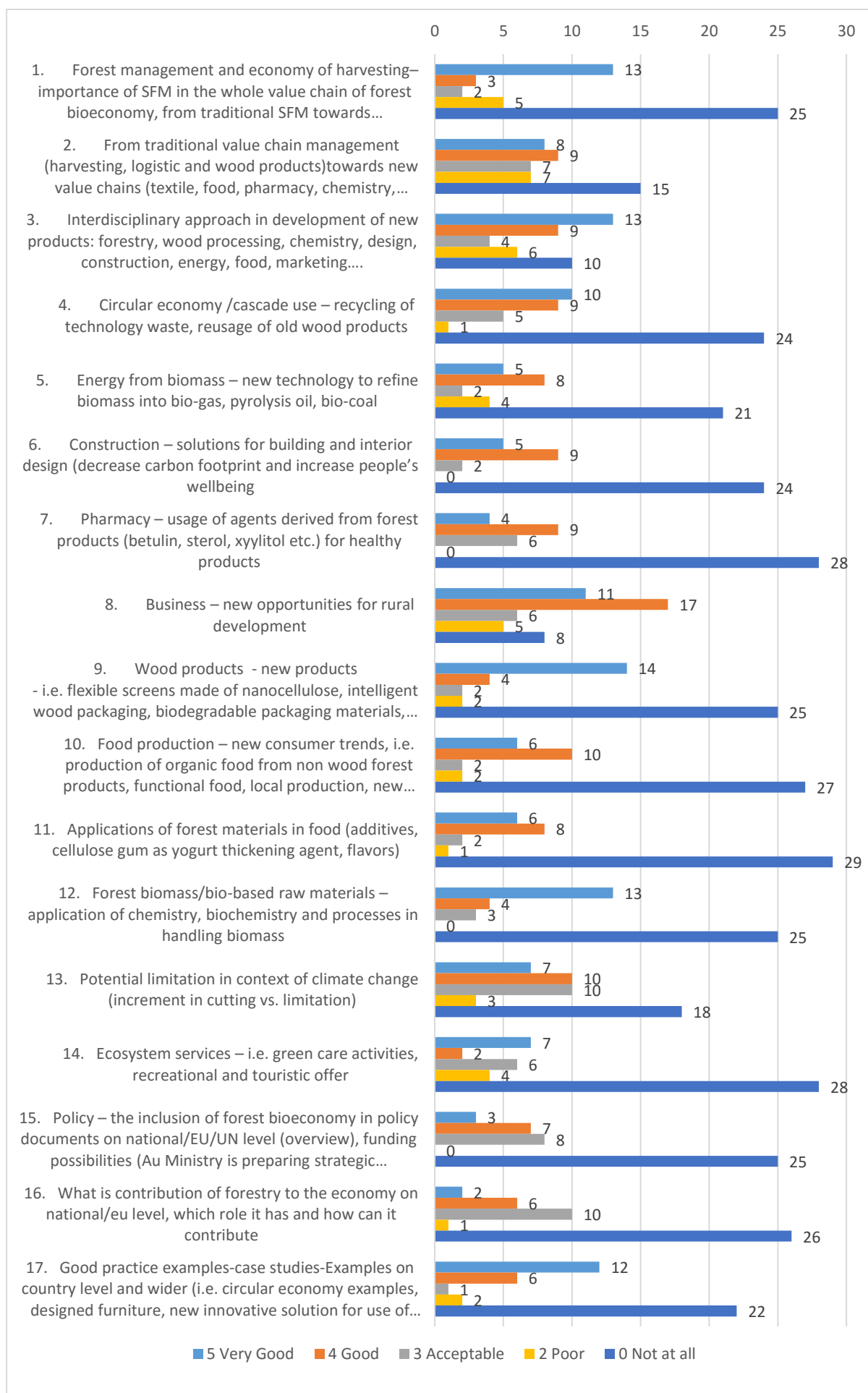
10 (40%) courses covered no.8: Business – new opportunities for rural development “very good”

Sustainable Forest management and wood harvesting has a long tradition in Austria, so courses targeting topics no. 1, 8, 13, and 14 (SFM, business basics, climate change, contribution of forestry and basic ecosystem knowledge) are very often important subjects of VET courses for future forest professionals.

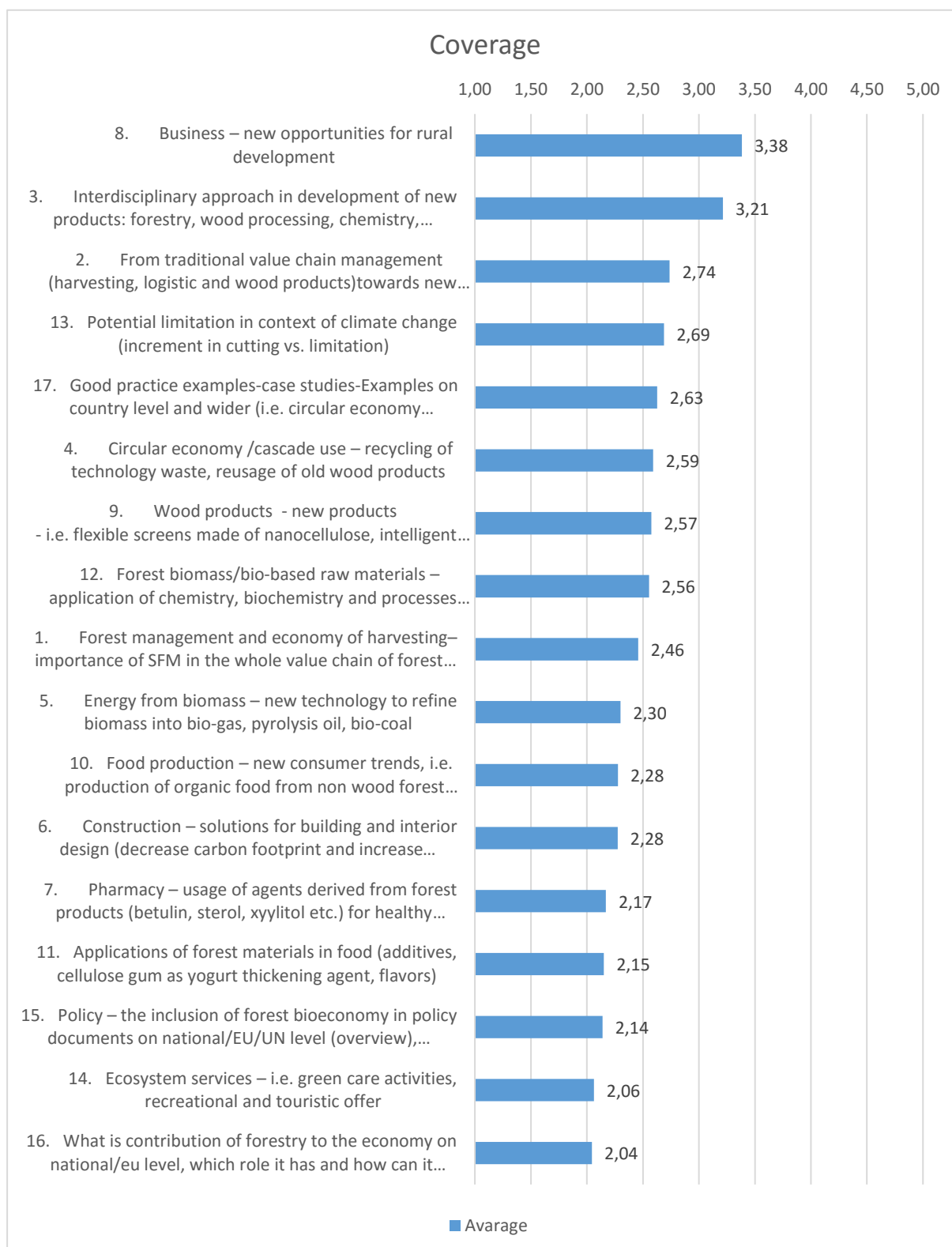
Whereas courses about new value chains and different products (2, 9, 10) are less common but covered in at least some of the available courses. Same applies for pharmaceutical and food products derived from wood and the forest. Important to note: it’s not about big scale production with a high technical production sites required but more of a renaissance of older traditional means of using non-wood products like herbs and resin for example.

Very little content is available for topic no. 4 (circular economy), 15 (policy) and 16 (contribution of forestry). The reason for this might be because of the traditionally small-scaled forests in Austria with their owners having little business opportunities in these fields of profession.

1.4. The overview of results regarding topics' coverage



The previous graph shows the number of answers chosen per each of suggested level of coverage, from “not at all” to “very good”. In general, there is no topic marked as mostly “good” and “very good” regarding the level of coverage in existing programs.



The next graph shows a ranking from the topic that is best marked regarding being present in current curricula, to the least covered one. The average mark is calculated based on a formula where “not at all” represents mark 1, “poor” 2, up to the “very good” representing 5.

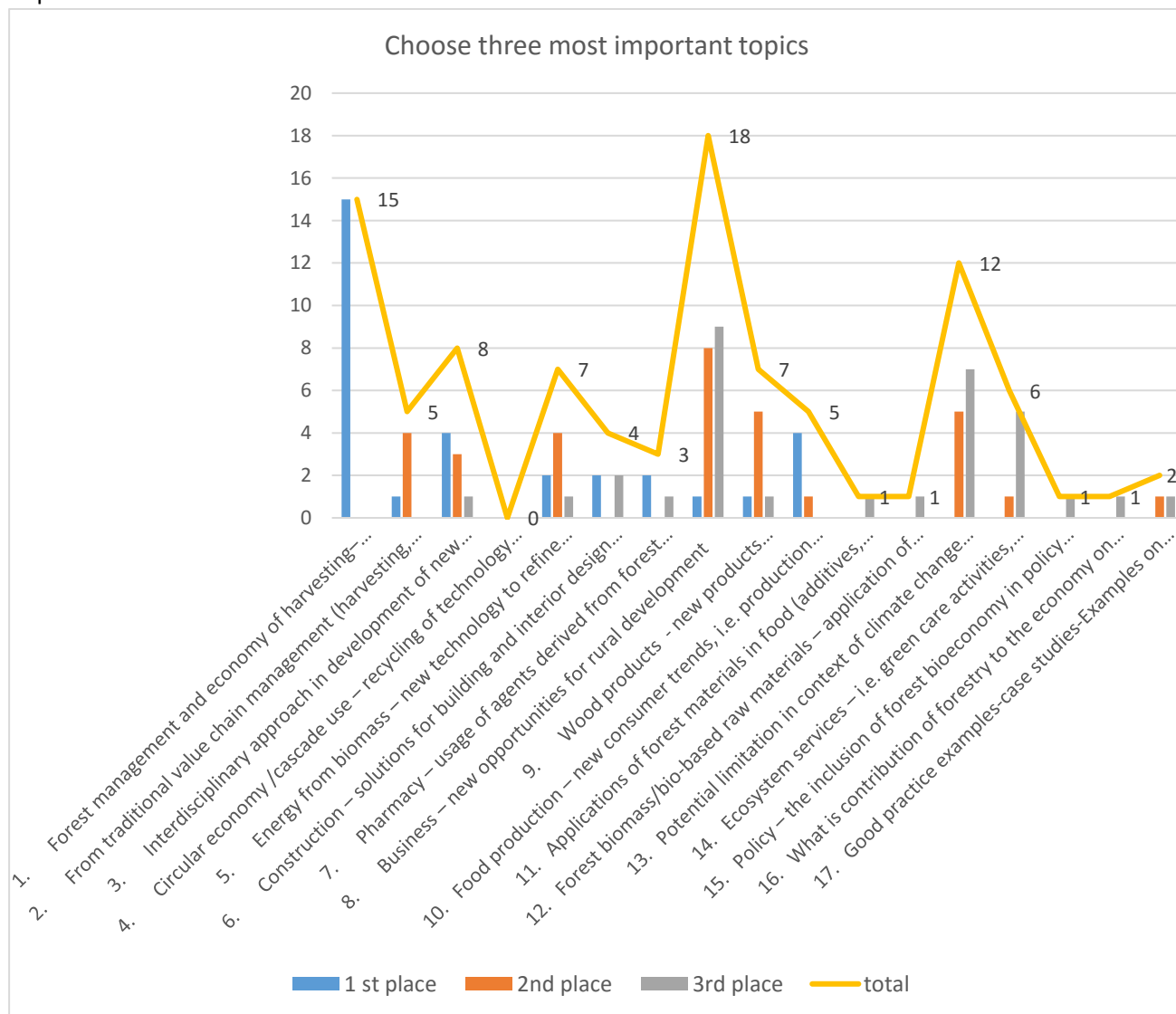
Best marked topics “8. Business - new opportunities for rural development” and “3. Interdisciplinary approach in development of new products: forestry, wood processing, chemistry, design, construction, energy, food, marketing....” are marked as acceptable in current curricula.

All other topics are covered less than acceptable if we count the average mark. That result confirms the need for developing a program for learning on forest based bioeconomy.

1.1. The overview of results regarding topics' relevance

Project team included in a survey following question, that is, an option for participant to choose three most important topics.

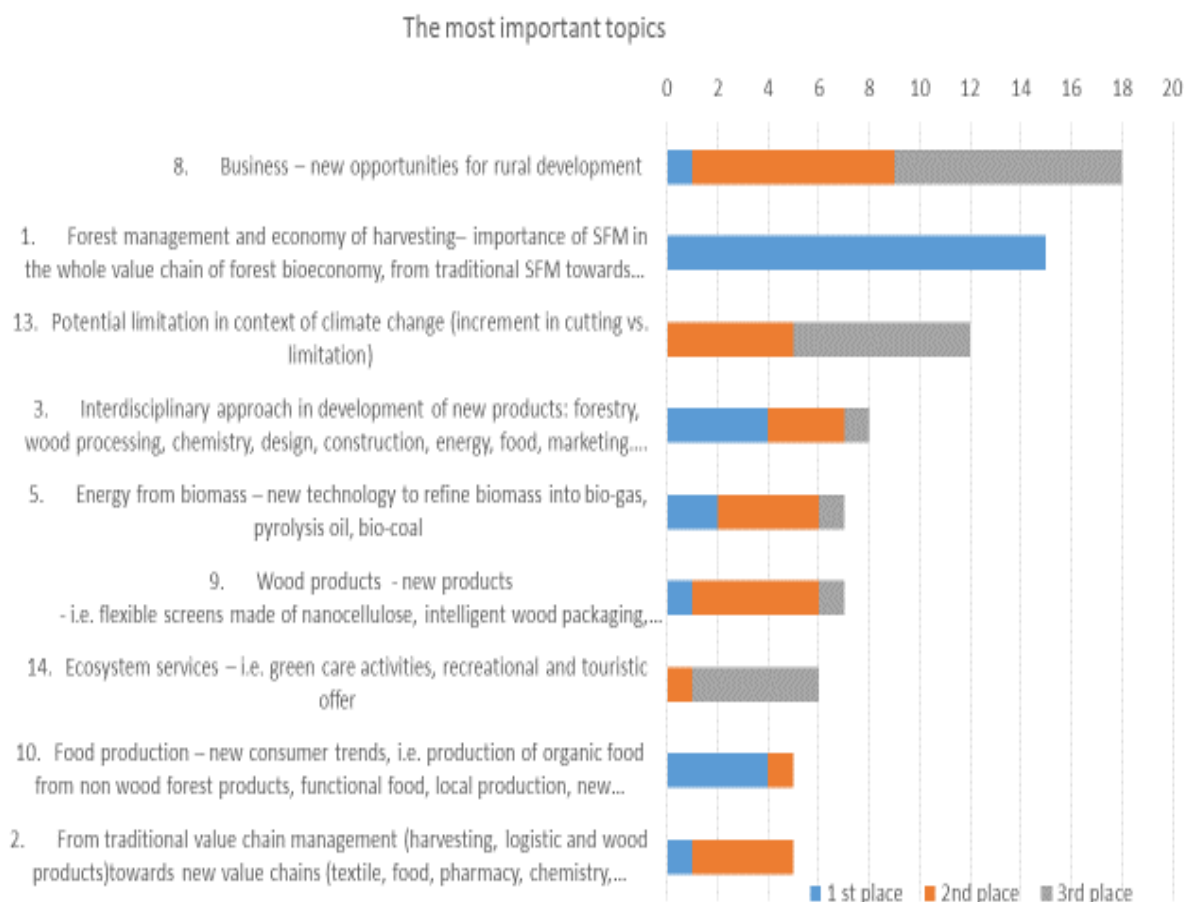
On the next graph we can see how many times a topic has been chosen as one of the three most important ones.



Topics that have been chosen the most, the highest number of times, are the following three:

- 8. Business – new opportunities for rural development
- 1. Forest management and economy of harvesting– importance of SFM in the whole value chain of forest bioeconomy, from traditional SFM towards interdisciplinary, forest bioeconomy oriented SFM-how to change management planning in order to produce various and added value products
- 13. Potential limitation in context of climate change (increment in cutting vs. limitation

Following graph present ranking of topics that have been chosen as the most relevant ones:



1.2. Conclusion and recommendation

As presented above, topics that were chosen as the most relevant for the forest based bioeconomy, are the following three:

- Business – new opportunities for rural development
- Forest management and economy of harvesting– importance of SFM in the whole value chain of forest bioeconomy, from traditional SFM towards interdisciplinary, forest bioeconomy oriented SFM-how to change management planning in order to produce various and added value products
- Potential limitation in context of climate change (increment in cutting vs. limitation)

At the same time, its presence in existing VET is not evaluated as good, not very good.

Therefore, the recommendation is to develop unique forest based bioeconomy curriculum and e-course, which will ensure comprehensive content for knowledge and key competences in forest based bioeconomy, focusing on topics as already presented above:

- Business – new opportunities for rural development
- Forest management and economy of harvesting– importance of SFM in the whole value chain of forest bioeconomy, from traditional SFM towards interdisciplinary, forest bioeconomy oriented SFM-how to change management planning in order to produce various and added value products
- Potential limitation in context of climate change (increment in cutting vs. limitation)

2. The overview of good practice examples

2.1. Introduction

The lack of national online learning programs on forest bioeconomy in Austria, Croatia and Slovenia induced us to initiate our ERASMUS+ project VET4BioECONOMY. Although in case of Austria there is existence of huge variety of online courses, they are primarily created for farmers and all sort of agricultural professionals. Therefore, we were searching for online courses in the field of (forest) bioeconomy on the European level.

For finding good practice examples an online research was conducted. During the online research we used following key words and their combination: 'bioeconomy', 'online course', 'e-learning', 'biomass', 'forest bioeconomy'. Additionally, the booklets for the two Forest Training Centers (FAST) of the BFW (Ossiach and Traunkirchen) were investigated and an interview was held about general issues regarding the FASTs. It turns out, that all available courses, for all training centers, forestry, agricultural and so on, can be found online. Also, the results of the Horizon2020 project ROSEWOOD were used for this particular research.

At the end we will introduce six good practice examples. Four of six are in English language, while two of them were from Austria, available only in German language.

2.2. Good practice example 1: Innovations in Bioeconomy

This GPE was found via online research. It is a GPE because it offers a University student to study courses 100 % online, so it allows to complete courses regardless of time and place. Student can select this course free of charge and include it in its degree. The main weakness of this online course is that it is not accessible to non-students.

Title	Innovations in Bioeconomy
Country/Region	Finland
Provider	CampusOnline.fi, JAMK University of Applied Sciences
Target group(s)	University students
Duration	162 hours
Credits	6 ECTS
Language	English
Methodology(ies)	Distance learning. Free online courses for students of University of Applied Science (UAS). Other Open UAS students pay a fee determined by the university of applied science that offers the course in question.
Overview (main topics or general coverage, other characteristics)	The student gets a deep insight into bioeconomy, its state of art, policies, strategies and business value in Finland, Europe and rest of the world. The course builds on analyses of business models in bioeconomy by means of case studies of Finnish and international companies. The course sheds light on the design and innovation of sustainable business models. The student searches and processes knowledge of innovations, new

	biotechnologies and research results in bioeconomy to answer problems coming from SME's. The student gets to know novel practices or solutions in the field of bioeconomy in project work.
Methodology description (Lectures, Laboratory, Excurison)	Assignments and reading lists of essential web pages or books will be in e-learning site. Independent studying. Distance learning. Case-studies. The student makes his/her own information retrieval for information service work and project work. Putting the assignments and project reports in assignment return box in e-learning site.
Evaluation/Exam	Assignments 100 %, grading scale 0-5
Link	http://campusonline.fi/en/innovations-in-bioeconomy/

2.3. Good practice example 2: Biobased Products for a Sustainable (Bio)economy

This GPE was found via online research. It is a GPE because it has an open access and it is free of charge, only the certificate is payable. This course is for beginners in the field of Bioeconomy, prerequisites are basic knowledge of a natural science like biology. 10 recognized Instructors from different Universities offer a diverse level of knowledge from the field of Biomass. This online course is offered by the edX platform and is performed by Delft University of Technology (Netherlands) and RWTH Aachen University (Germany).

Title	Biobased Products for a Sustainable (Bio)economy
Country/Region	Netherlands and Germany, Europe
Provider	edX – Delft University of Technology (Netherlands) and RWTH Aachen University (Germany)
Target group(s)	All
Duration	7 weeks, 5 to 6 hours per week
Credits	-
Language	English
Methodology(ies)	Free of charge online course. Option of gaining a verified certificate for 44 €.
Overview (main topics or general coverage, other characteristics)	The course describes the different types of biomass, the methods of refinery and typical conversion technologies used for biobased products. Students will also engage in a study of the practical and real-life examples emerging in the market: biopolymers, bioenergy, bioflavours, and biosurfactants.

	What will you learn: <ul style="list-style-type: none"> • How to judge the opportunities for biobased resources as alternative feedstocks compared to fossil resources • The challenges and opportunities of the bioeconomy and the basic elements of the value chain • Real life examples of biobased products of the bioeconomy, such as biosurfactants, bioflavours, bioenergy, and biopolymers • How biobased products are produced • The key issues that must be overcome for the commercialization of such products
Methodology description (Lectures, Laboratory, Excursion)	Video lectures in English language and English transcripts
Evaluation/Exam	-
Link	https://www.edx.org/course/bio-based-products-for-a-sustainable-bioeconomy#!

2.4. Good practice example 3: Opportunities to replace fossil fuels

The good practice example was collected within the Horizon2020 project ROSEWOOD. ROSEWOOD is designed to develop regional networks that will connect actors of the wood mobilization value-chain to cover and find answers to the main challenges in the field.

Within the project, partners (including CFRI) implement a screening of educational courses and some of those courses were found as good practice examples in forest bioeconomy, but there was only one online course.

It is a GPE because it offers a participant to study course online, it is free of charge and in English language. Also, it is mainly based on videos so it is not static. Introduction is very catchy. The topics are strictly bioeconomy related (i.e. economy, cascade use of wood resources, carbon storage and cycle, energy efficiency).

Title	Opportunities to replace fossil fuels
Country/Region	Finland
Location/Implementer	Bioacademy
Users	University students and bioeconomy and forestry professionals.
Duration	
Credits	
Language	English
Methodology- Course format	Free online courses E-Learning, Desktop and mobile
Overview (main topics)	You will understand the big picture of lifecycles of different

or general coverage, other characteristics)	energy sources and their net profits. Introduction (1 min); Economy (4 min); New Avenue of Economy; Definitions; Cascading Principle of Wood Based Economy; Carbon Increase, Decrease and Balance; Carbon Cycle and Age of Fixed Carbon; Options of Carbon Storage; Synthesis; Energy Efficiency
Methodology description (Lectures, Laboratory, Excurison)	In 5 parts of disscusion about energy sources, filmed disscussion with lecturer PDF material, presentation Each part is filmed as lesson with presentation
Exam	no
Link	https://www.bioacademy.fi/

2.5. Good practice example 4: Boosting Bioeconomy Knowledge in Schools

This GPE was found via online research. It is a GPE because it had an open access and it was free of charge and the badge can be exported to the Mozilla Badge Backpack. The course was co-created by a network of 20 STEM teachers and their schools in 10 European countries. This e-course is not focused only on bioeconomy, but also to show teachers how bioeconomy can be introduced in different STEM subjects.

Title	Boosting Bioeconomy Knowledge in Schools
Country/Region	Europe
Provider	Bloom (Horizon2020) EU funded project
Target group(s)	science, technology, engineering and mathematics (STEM) teachers, both in secondary and primary education. Teachers of other subjects, as well as teacher trainers and bioeconomy stakeholders can benefit from the course.
Duration	5.5 weeks, 2-3 hours per week, total estimated time: approximately 17 hours
Credits	a course badge and a course certificate upon completion of the full course.
Language	English
Methodology(i es)	Free of charge online course.
Overview (main topics or general coverage, other characteristics)	This MOOC aims to bridge the gap in education by giving teachers a fresh perspective into the bioeconomy field and its applications in teaching STEM subjects. The course will do so by presenting the BLOOM School Box, a series of lesson plans co-created by 20 pilot teachers in 10 European countries, which illustrate how bioeconomy

	<p>can be introduced in different STEM subjects.</p> <ul style="list-style-type: none"> • Understand what bioeconomy is, its importance for society and for students, and its implications for education. • Explore the BLOOM School Box and learn how they can use it in their teaching. • Learn how to use bioeconomy in educational contexts. • Know what the BLOOM project is, and how it can help teachers innovate their classroom practices. <p>List of modules:</p> <p>Course Introduction</p> <p>Module 1: Bioeconomy in our lives</p> <p>Module 2: The BLOOM School Box: bioeconomy in the classroom</p> <p>Module 3: Teaching with bioeconomy</p> <p>Module 4: Your bioeconomy learning scenario</p>
Methodology description (Lectures, Laboratory, Excurison)	
Evaluation/Exam	-
Link	https://www.europeanschoolnetacademy.eu/en/web/bloom-mooc?fbclid=IwAR3xvCQRYiqyRhdiXvdvrpmtxbpf6G2TW_R0ksuVsub1zVWXH4gEw8UiGoU

2.6. Good practice example 4: Future Farms

This GPE is provided by the Ländliches Fortbildungs Institut (LFI) and aims to to help farmers utilize the internet and social media in order to adapt to the requirements and demands modern society has on providers for foods and other agricultural goods. It also shows opportunities and threats arising with the ever present cross-linking of internet in rural production. It is not originally meant for the sector of forest-bioeconomy but nevertheless it is a GPE in how content can be provided in a modern and very practical way.

Title	Webinar: “Bauernhof der Zukunft” “Future Farms”
Country/Region	Austria
Provider	LFI Ländliches Fortbildungs Institut
Target group(s)	Professionals from the agricultur sector
Duration	1 ½ hours

Credits	
Language	German
Methodology(ies)	Interactive online course
Overview (main topics or general coverage, other characteristics)	<p>It's not exactly forest related, but nevertheless a good practice example for providing modern training on burning issues:</p> <ol style="list-style-type: none"> 1.) connection vs. segregation 2.) WE as influencers of the future farms 3.) Agriculture 4.0=farmstead5.0=present agriculture 4.) New opportunities through downsizing, diversity, education 5.) Together: talking – developing - working
Methodology description (Lectures, Laboratory, Excurison)	Participants attend online in real-time. During the lecture they participate in surveys, can write questions and interact with the lecturer. The whole session was recorded and is still available online.
Evaluation/Exam	No exam
Link	https://oe.lfi.at/lfi-webinar-aufzeichnung-bauernhof-der-zukunft-vom-28-februar-2018+2500+1714114

2.7. Good practice example 6: Advanced Forest professional Course

This GPE is basically provided by each and every Forest Training Center in Austria. This shows its significance. Its curriculum aims to provide decent knowledge and skills to perform safe forest operation and basic knowledge about the ecosystem forest.

Title	Forstfacharbeiter – Lehrgang: Advanced Forest professional Course
Country/Region	Austria
Provider	FAST Traunkirchen (as well as Ossiach and Pichl)
Target group(s)	Forest professionals, Forest owners, Farmers who also own (small) Forests
Duration	6 weeks
Credits	
Language	German
Methodology(ies)	Lectures and hands-on training on-site
Overview (main topics or general coverage, other characteristics)	<p>Content:</p> <ol style="list-style-type: none"> 1.) Basics of chainsaw working (1 week) 2.) Basics of silviculture (1 week) 3.) Wood – measuring and sorting (1 week) 4.) Advanced forest professional Course (3 weeks)
Methodology description (Lectures,	Lectures in the classroom where participants learn basics of the particular topics. Afterwards the theoretical knowledge will be put into practice and trained in the woods.

Laboratory, Excurison)	
Evaluation/Exam	A written exam after each module
Link	http://www.fastort.at/index.php/kurskalender

3. Conclusion

First four good practice examples are online courses in English language, free of charge. Typically they are easily available to anyone interested, but tailor made for students or forestry/bioeconomy professionals. The topics vary from strict insight into bioeconomy, biobased products to business models and carbon storage in the context of bioeconomy. They use various methodologies such as video lecturers, filmed discussions, animations, PDF documents and presentations and other useful web links.

The last two courses are good practice examples, but available only in German language with a completely different approach and agenda. One **Advanced Forest professional Course** provides very basic skills for a safe and sustainable forest management, which in fact is the foundation for forest bioeconomy. The other **Future Farms** aims to empower farmers to take advantage of new technologies. The content of the **Advanced Forest professionals Course** is very much given and fixed and demands the participants to be present at all time, whereas the online lectures can be adapted to changing needs of participants very easily and can be done at home respectively at the farm.

These courses provide us a good basis in the context of methodologies and content, but also in a term of future sustainability of the course. For example, one of them is free of charge but offers a payable option of gaining a verified certificate. The good practice examples are an inspiring basis for production of our future online course on forest bioeconomy in a certain time and budget frame.