

# INTEGRATING PRIMARY PRODUCERS INTO BIOBASED VALUE CHAINS

## SESSION #1: PRODUCTION OF BIOMASS FROM FARMERS AND FORESTERS

09 November 2023



# Integrating Primary Producers into BioBased Value Chains

## Session #1: Production of biomass from Farmers and Foresters

### AGENDA SESSION #1

Thursday 09 November 2023 from 9:00 am to 12:00 pm CEST

<b>09:00 – 09:15</b>	<b>Main room – Presentations in English/French</b> Warm-up: Where are we located? Introduction to the SCALE-UP project, Zoritz Kiresiewa
<b>09:15 – 09:30</b>	<b>Producers in the Value Chains of Bioeconomy: overview</b> Emilija Mihajloska, SDEWES-Skopje
<b>09:30 – 09:50</b>	<b>Miscanthus biomass: production and use cases</b> Ludivine Mignot, Chamber of Agriculture of Pyrénées-Atlantiques
<b>09:50 – 10:10</b>	<b>Testimonials from producers</b> Composting plant in North Macedonia (Cvetanco Gjorgiev) Forestry in Sweden (Arne Smedberg)
<b>10:10 – 10:20</b>	<b>Short break</b>

<b>10:20 – 11:20</b>	<b>Break-out rooms</b> Moderated in your language by a facilitator in your region. Collective discussions. See page 2
<b>11:20 – 11:30</b>	<b>Short break</b>
<b>11:30 – 12:00</b>	<b>Main room – Presentations in English</b> Feedback on the key outcomes and questions from the breakout rooms Conclusions and how to move forward.
<b>Short survey: give your feedback on the training</b>	





# INTRODUCTION TO SCALE-UP

Zoritzia Kiresiewa  
Ecologic Institute

9 November 2023

SCALE<sup>UP</sup>  
community-driven  
bioeconomy development



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101060264.

# THE SCALE-UP PROJECT

A three-year EU-funded project, aiming to achieve:

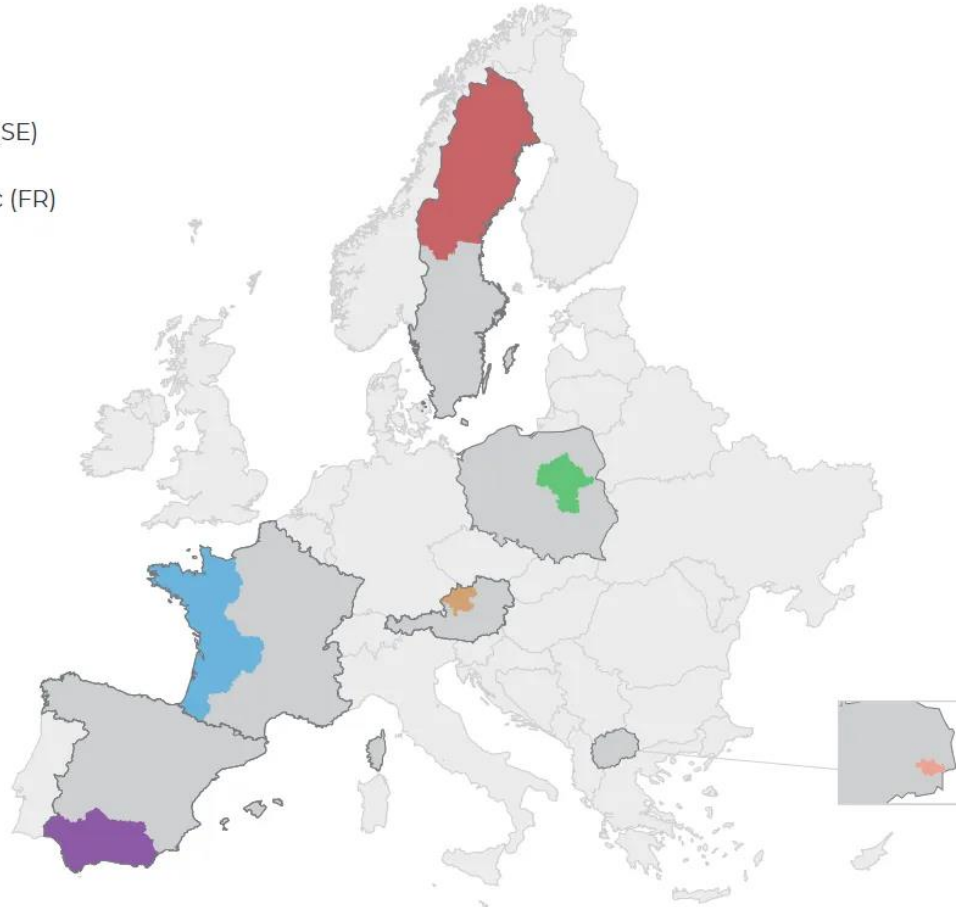
- Increased capacity of regional multi-actor partnerships to accelerate the development of marketable bio-based products and services.
- Strengthened collaboration between **primary producers**, SMEs, clusters, social actors, and policymakers.
- Improved knowledge about nutrient recycling potentials in regional bioeconomies.
- High level of awareness and understanding of the bioeconomy and its impacts on local communities.
- Promotion of a sustainable, inclusive and just regional bioeconomy.



# SCALE-UP'S FOCAL REGIONS

## SCALE-UP regions

- Northern Sweden (SE)
- Mazovia (PL)
- French Atlantic Arc (FR)
- Upper Austria (AT)
- Strumica (MK)
- Andalusia (ES)



Region	Biomass streams
<b>Northern Sweden</b>	needles and tops, bark, sawdust, shavings...
<b>Mazovia</b>	apple prunings and apple pomace
<b>French Atlantic Arc</b>	flax, hemp and miscanthus
<b>Upper Austria</b>	beer & bakery production (grains), fruit production, sunflower oil
<b>Strumica</b>	agricultural residues, by-products of food processing
<b>Andalusia</b>	olive prunings, pomace and wastewater

Source: SCALE-UP project



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# PRODUCERS IN THE VALUE CHAINS OF BIOECONOMY: OVERVIEW

Emilija Mihajloska,  
SDEWES-Skopje  
09/11/2023



# WS2: INTEGRATING PRIMARY PRODUCERS INTO BIO-BASED VALUE CHAINS

## Problem statement

- In the bioeconomy, primary producers are often left behind in the value chain, despite being the foundation for successful production of bio-based products and processes.
- This is due to a lack of information and education on relevant topics, as well as a lack of consistent networking.

## How to solve it

- The integration of primary producers is crucial for the success of the bioeconomy, and addressing these issues is necessary to ensure their participation and success in the value chain.
- Bioeconomy Needs Analysis to assess the state-of-the-play in the regions
  - Sent to over 450 stakeholders
  - Stakeholders: Primary producers, landowner; Large-scale enterprises; SME/Start-Ups; Governments and policymakers; Civil society; Academia, Research, Education; Financial sector; Other (including Clusters, Associations, Business Support Organizations)
- With the SCALE-UP training programme, solutions to tackle issues identified in the questionnaire.



# GENERAL OVERVIEW OF BIO-BASED VALUE CHAINS AND ROLE OF PRIMARY PRODUCERS

## What Are Bio-Based Value Chains

- Bio-Based Value Chains encompass a range of processes and products that are derived from biological sources, such as plants, animals, and microorganisms.
- These value chains transform these resources into a wide array of products, from biofuels and bioplastics to pharmaceuticals and renewable energy.

## The Role of Primary Producers

- Primary producers, including farmers and foresters, form the bedrock of bio-based value chains.
- They are the initial source of raw biological materials, supplying the essential feedstock that powers these chains.
- Primary producers are the stewards of our natural resources, and their role in the value chain is pivotal.

# GENERAL OVERVIEW OF CHALLENGES AND BENEFITS

## Challenges Faced by Primary Producers

- Despite their indispensable role, primary producers often grapple with numerous challenges.
- Accessing markets, maintaining sustainable practices, and effective resource management are hurdles that they must navigate.
- Their challenges are significant and addressing them is crucial to achieving the sustainability goals of bio-based value chains.

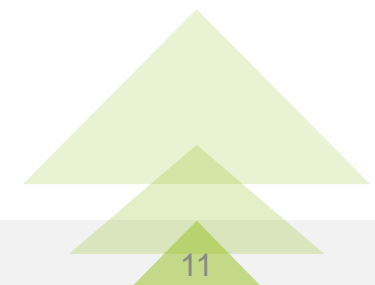
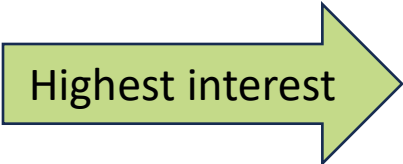
## Benefits of Integration

- Integrating primary producers into the value chain brings forth a multitude of advantages.
- These include economic opportunities, increased value addition, and the promotion of sustainable practices.
- It's not just a partnership; it's a mutually beneficial relationship that strengthens the entire value chain.
- Database of best practices as Sustainable Agriculture examples

# REGIONAL OVERVIEW IN KNOW-HOW AND INTEREST

- Second highest interest rated workstream
- Cross-regional rating of the know-how and interest in the sub-topics of work stream 2 “Integrating primary producers into bio-based value chains” on a scale of 1-5 (less to more relevant) with the total number of votes from all participants

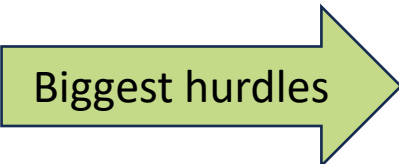
Training topics of work stream 2	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Networks, Associations, Clusters	6	10	27	25	13	3	8	16	26	26
Legislation, Regulation, Funding schemes	13	20	24	12	11	3	6	12	31	25
Markets and business models for bio-based value chains	4	28	25	15	9	1	7	17	22	33
New forms of farming in agriculture and forestry	10	17	24	15	13	4	4	19	25	28
Ecological load limits of biomass production	10	18	21	16	14	4	7	19	16	31



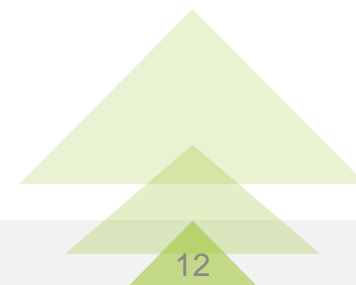


# REGIONAL OVERVIEW OF HURDLES

- Cross-regional rating of the hurdles of integrating primary producers into bio-based value chains on a scale of 1-5 (less to more relevant)



Challenges of integrating primary producers	1	2	3	4	5
Lack of awareness towards bio-based solutions for primary producers	6	4	26	<b>28</b>	20
Not enough coordination between primary producers	3	11	<b>23</b>	22	<b>23</b>
Primary producers are not interested in bio-based solutions	7	17	<b>28</b>	17	10
Lack of enabling framework	2	3	26	<b>28</b>	15



# FROM SURVEY ASSESSMENT TO TAILOR-MADE TRAINING PROGRAM

**November 9, 2023**

**Session 1 "Production of biomass from Farmers and Foresters"**

**November 21, 2023**

**Session 2 "Value chains and markets: linking producers and stakeholders"**

**December 7, 2023**

**Session 3 "Innovations and challenges in production and mobilization of biomass"**

THANK YOU FOR YOUR ATTENTION

[sdewes.skopje@sdewes.org](mailto:sdewes.skopje@sdewes.org)

## PROJECT PARTNERS



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# Miscanthus

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## Miscanthus-based bio-sourced materials



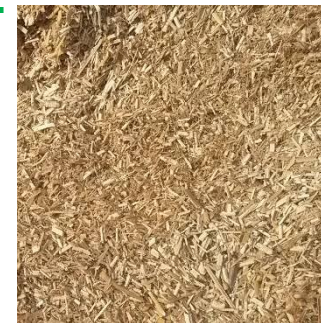


# The plant



- **Miscanthus Giganteus**

- Non-invasive sterile hybrid originating in Asia.
- Fast-growing C4 plant.
- Multiplication by rhizome
- **Perennial** plant 15 to 20 years
- Adapts to all types of soil
- Simple crop **0 fertiliser - 0 pesticides**
- One harvest a year at the end of winter **12 to 15T/ha** using a bulk maize forage harvester
- Low density: **120 to 140kg/m<sup>3</sup>** => **115m<sup>3</sup>/ha**
- 2 years before the first harvest
- Not sensitive to rodents





# Miscanthus



Plantation



15 days after planting



June year 1



September year 1



September year 3



Harvesting maize forage harvesters



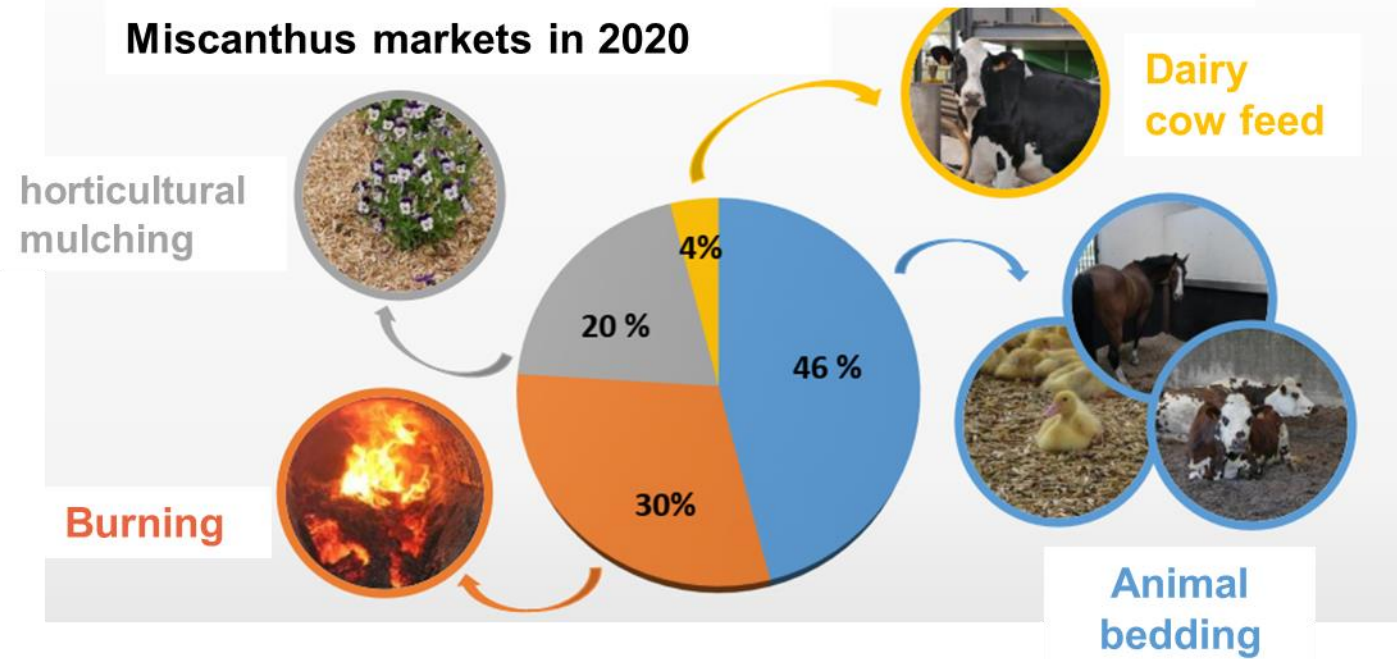
# Applications



A non-food crop that does not compete with food, as it is eligible to :

- water catchment protection areas
- areas of ecological interest
- no-treatment zones

## Miscanthus markets in 2020



# Type of miscanthus-based materials



## Miscanthus concrete

*ADEME fact sheet 2011*

### TECHNICAL CHARACTERISTICS OF MISCANTHUS CONCRETE :

- Density: 440kg/m<sup>3</sup>
- Surface thermal resistance: R = 3.03 m<sup>2</sup>.K/W UF1
- Thermal conductivity: 0.0915 W/m.K
- 1 FU (Functional Unit) = 1 m<sup>2</sup> of wall lined with 20cm of miscanthus concrete

Sources : BBRI (2010), RVécohabitat

### MISCANTHUS: A NEW BUILDING MATERIAL

#### EXAMPLE FOR A MISCANTHUS WALL 20 CM THICK AND A SURFACE AREA OF AROUND 40M<sup>2</sup> :

- 40 litres of air lime
- 200 litres of miscanthus (approximately 1cm thick)
- 20 litres of plaster- 20 litres of pumice stone (0.4 mm diameter)
- cost (material + labour): 60-70 €/m<sup>2</sup> (+ 20-30 €/m<sup>2</sup> for finishing)

Made by RVécohabitat

# On an industrial scale



## Alkern / Concrete block announced in 2017 - Plant 2024

- Construction of manufacturing plant at Andelys (Eure) Start-up 1<sup>er</sup> half-year 2024
- Block with 30% miscanthus replacing mineral aggregates
- 40% reduction in the carbon footprint of blocks
- Envisaged annual savings of 2000 to 3000T of CO<sub>2</sub>
- Production 25km around the plant, estimated at 100ha



# On an industrial scale



## Muance / Prefabricated modular building - Plant 2022

- For local authorities
- Technical accreditation of modules
- 14 housing by March 2024
- Seeking to manufacture miscanthus-based insulation (<50km) for its modules
- Plant at Vatry in the Marne department

# On a pre-industrial scale



## Kellig Emren



-  Production et process de matériaux de construction avec des matières premières végétales
-  21 500 € de chiffre d'affaires
-  2 collaborateurs
-  ZA de Kermestre, 56150 Baud
-  Partenaires : Akta BVP, Akterre, Sable Vert, Centre Morbihan Communauté, Institut de Recherche Dupuy de Lôme, BPI France, Région Bretagne



### Panneau en béton végétal (miscanthus, terre crue, chaux)



<b>Familles</b>	Isolant Cloison
<b>Application</b>	Tertiaire Logement collectif Logement individuel
<b>Points mis en avant par le porteur d'innovation</b>	Sobriété et économie de moyens et d'énergie sur toute la chaîne des acteurs Vertueux en fin de vie : production de nouveaux isolants, compostable et valorisable en amendement

### Avis du hub

Ressources très locales, produit offrant une réponse à plusieurs fonctions par ses caractéristiques. L'absence de FDES ne permet pas de se prononcer sur le rapport coût-carbone.

### MATURITÉ

<b>Développement</b>	Validation
<b>Réglementation</b>	Pass innovation 2021 : ATEX de type B
<b>Données env.</b>	FDES en cours de réalisation

### RESSOURCE

<b>Origine</b>	Rayon de 15 km autour de l'entreprise
<b>Capacité de production</b>	Miscanthus : 8 000 Ha Production de 8000 m <sup>2</sup> d'isolant par an

### PERFORMANCES

<b>Épaisseur</b>	7,5 cm
<b>Performance thermique</b>	$\lambda = 0,077 \text{ W}/(\text{m.K})$ , soit $R=0,97 \text{ m}^2.\text{K}/\text{W}$
<b>Réaction au feu</b>	B-s1, d0
<b>Résistance flexion</b>	0,20 MPa

### COÛT

<b>Fourniture et pose</b>	ITE : 89€/m <sup>2</sup> ITI : 174€/m <sup>2</sup> ~ 800 € (prix de revient ttc au m <sup>2</sup> SDP)
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### CO<sub>2</sub> CARBONE

<b>Taux de biosourcé (en masse)</b>	59 % Donnée indiquée par le porteur
<b>Stockage biogénique</b>	Non connu
<b>Impact carbone</b>	Non connu

### MISE EN OEUVRE

<b>Spécificité</b>	Diagnostic de gestion d'humidité
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# Type of miscanthus-based materials



## Naturconcept ecoconstruction Luxembourg

### Benefits

- 100% natural product
- Easy to use and quick to prepare
- Suitable for mixing and spraying machines
- Thermal and acoustic insulation
- Humidity and temperature regulation
- Fire protection and resistance
- Health and environmental qualities

### Dosing

Lime: 40 kg (Air 45% / Hydraulic 55%)  
Miscanthus (2-25 mm fibres): 200 L  
Water: 50 L



### Physical characteristics

- Miscanthus thermal conductivity  $\lambda$  : 0.09 W/mK
- Thermal resistance 4.16m<sup>2</sup>.K/W
- Miscanthus density  $\rho$  : 500 kg/m<sup>3</sup>
- Miscanthus heat capacity  $c$  : 580 [J/(kgK)]
- Vapour diffusion resistance coefficient  $\mu$  : 8
- Phase shift: 9 a.m.



# Search in progress

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## Standardisation of plant aggregates: [NG2B](#)

*Despite a great deal of work => the problem of moving from research to an easily usable and insurable product.*

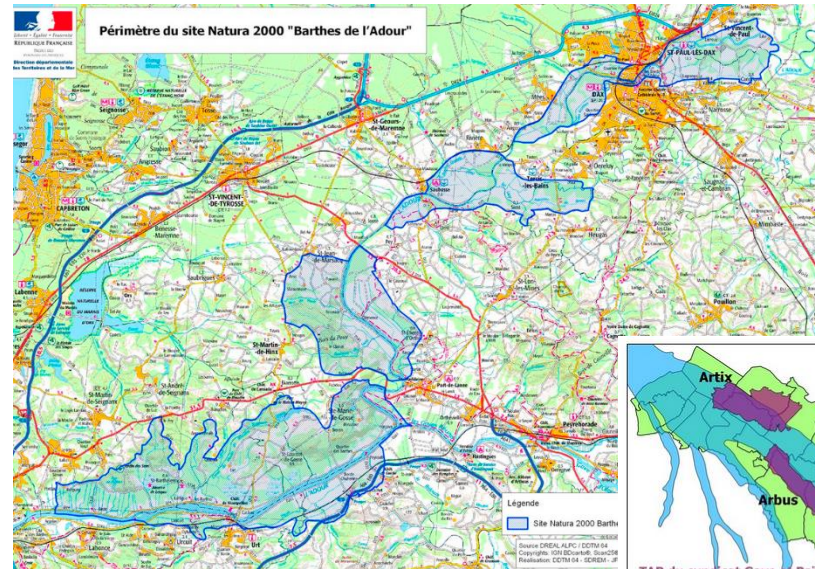
- Objectives: common reference system for all players in the sector, based on relevant and consolidated technical and environmental data, enabling materials to be specified and recommendations to be made.
- Eventually: specific standards framework for plant-based aggregates intended for bio-sourced mortars and concretes, with a view to standardisation at European level.

# Our work



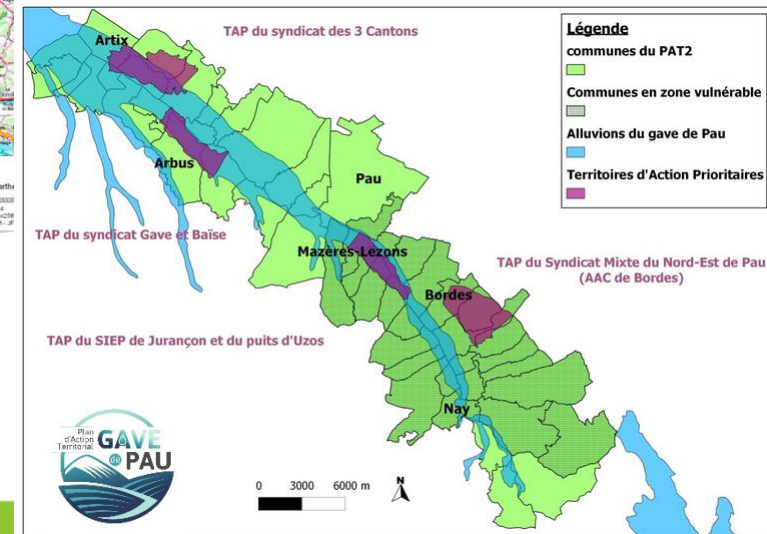
- **In the Pyrénées-Atlantiques and Landes regions**
  - Interest in production in areas where water is an issue

**PAT Gave de Pau and Barthes de l'Adour area**



**=> 8500ha of farmland**

**16 856 ha of farmland <= 650ha of which in close catchment = drinking water**



# Our work



## Developing a network of stakeholders




- From the farming community
- Teaching and research
- Prescribers
- Very small businesses
- (Users)
  
- => To structure local development
  
- => In a coherent production network
- => Improving farmers' incomes
- => Preserving our resources



# Our work



- **First trial 2022: Exploratory study of plant fibres for lightweight soil - Nobatek/IFEP4**
  - Miscanthus target compared with chenevotte and wheat straw

RESULTS	Hemp shives	Miscanthus	Straw
Pictures			
Handling	Excellent Good wrap Non-elastic material Fibre length < 1cm Easy to mould	Medium Medium wrap Non-elastic material Fibre length 1 to 3 cm Medium moulding	Low Difficult to wrap (silica) Very elastic material Fibre length 3 to 10 cm Difficult moulding (size of fibres, elasticity)
Fibre density	150 kg/m <sup>3</sup>	190 kg/m <sup>3</sup>	135 kg/m <sup>3</sup>
Dry consistency	Excellent Very clean material	Average Dust seems to affect cohesion	Good The adhesion that seems wet, is resolved on drying.
Compression	Compressible materials. There is no breaking strength; the material becomes denser as a function of the force applied. Straw is also highly elastic.		
Thermal conductivity	= 0,090 W/m <sup>2</sup> .K λ	= 0,067 W/m <sup>2</sup> .K λ	= 0,061 W/m <sup>2</sup> .K
Ways to improve	Already optimised	Dust removal Finer grinding? Sorting? Defibration?	Shorter calibrated cut? Press drying

# Our work



## 2024: 5-6 month co-supervised internship

- the Pyrénées-Atlantiques Chamber of Agriculture in Pau,
- the Materials and Durability of Constructions Laboratory (LMDC) and Agromat in Tarbes
- NOBATEK/INEF4 in Anglet,

**Assessing the potential of plant-based aggregates  
from miscanthus stems  
for use in construction materials**



# Our work



## 2024: 5-6 month work placement

### Main objectives:

- Characterise miscanthus aggregate, particularly from an environmental point of view,
- Study the influence of the harvesting and pre-processing process on its properties as a plant aggregate
- Evaluating the performance of formulated composites from the material scale to the wall scale

### Additional objectives:

- Links between agriculture and the construction industry
- Clarifying languages
- Identify the development positioning





# LARGE-SCALE COMPOSTING: A GOOD PRACTISE FROM NORTH MACEDONIA

Cvetanco Gjorgiev,  
Municipality of Novo Selo

09/11/2023

SCALE<sup>UP</sup>

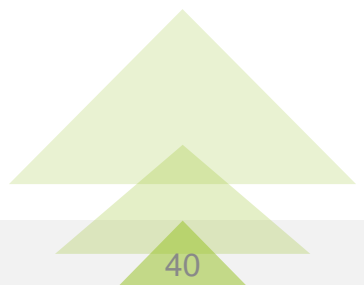
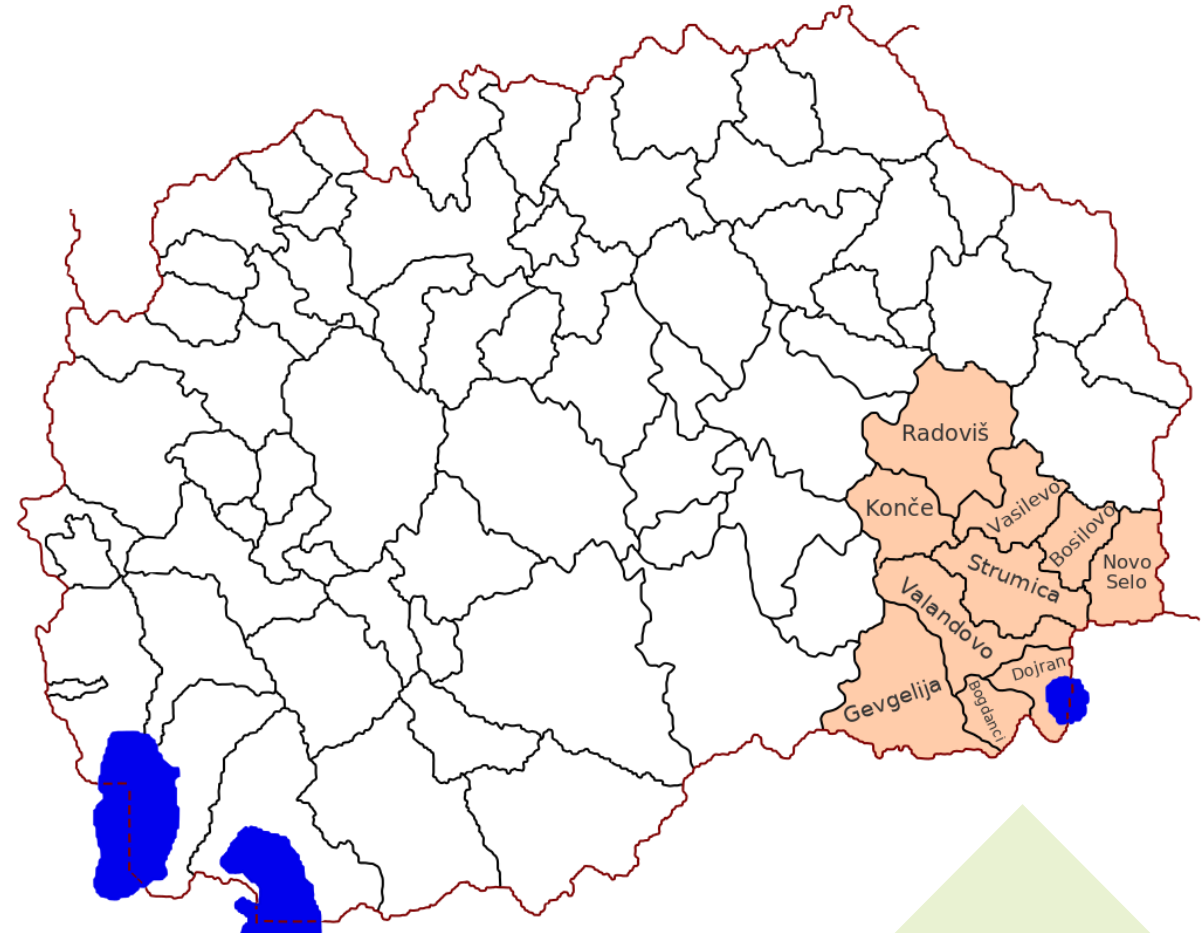
community-driven  
bioeconomy development



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# LOCATION BACKGROUND

- The southeastern region, which has about 180,000 inhabitants, is considered one of the largest agricultural regions.
- Annually, about 42 thousand tons of various waste are collected from this part of the country through the utility companies of a total of 10 municipalities, although it is assumed that at least another 10 thousand tons end up in the so-called wild dumps.
- According to the Regional Plan for Integrated Waste Management in the Southeast, about 22 thousand tons of biodegradable waste are thrown annually, which represents slightly more than 50 percent of all waste that ends up in landfills that are non-standardized and serve only for disposal without any selection or utilization for thermal energy.





# PERSONAL BACKGROUND STORY

- Winner of the second call for journalists and media to research and promote best examples of applying green economy or ecologically safe rural business practices.
- The competition was organized in 2021 within the project "Networking and Advocacy for Green Economy", financed by the European Union.
- Problem identified: Statistics show that in the Southeast, about 220,000 tons of biodegradable waste ends up in landfills.
- Approach: Instead of throwing away the waste and burning it, collection and generation of compost in his family business.



## INFORMATION ABOUT THE COMPOSTING PLANT

- Raw materials: remains of herbs, flowers and fruits, the reeds from the surrounding meadows and swamps
- The composter has been operating for four years.
- Area: four hectares
- Production: average of 5000 m<sup>3</sup> of certified organic compost is produced annually.
- Time: 1 turn for 6 months
- Two agronomists and six machine operators are involved in the process.



Source: <https://vistinomer.mk/organskiot-otpad-nosi-pari-ama-zavrshuva-na-deponii/>;  
<https://sitetel.com.mk/cvetancho-gjorgiev-od-strumica-zarabotuva-preku-prerabotka-na-qjubre>

# PLANS FOR THE FUTURE

- Packing
- Calibration
- Diversification of the compost types





# SCALE UP STUDY VISIT IN NOVO SELO





# SCALE UP STUDY VISIT IN NOVO SELO





# SCALE UP STUDY VISIT IN NOVO SELO



# THANK YOU FOR YOUR ATTENTION

Cvetanco Gjorgievski  
email: [cvetanco@hotmail.com](mailto:cvetanco@hotmail.com)

## PROJECT PARTNERS



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# CHALLENGES FOR A FOREST PRODUCER

Arne Smedberg



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# BREAKOUT ROOMS DISCUSSION TOPICS

**1. What are the biomass types available from your producers ? What is produced where ?**

**2. Dedicated crop or by-products from main crops: what are the main differences ?**

**3. Potential for the future : what could be the new opportunities ?**

**What are the driving factors: emerging markets and value chains, change of practices, climate change ?**





# BREAK-OUT ROOMS

You will be sent automatically  
in a few seconds

BO Room starts with 10 minutes Coffee Break  
Please come back soon !





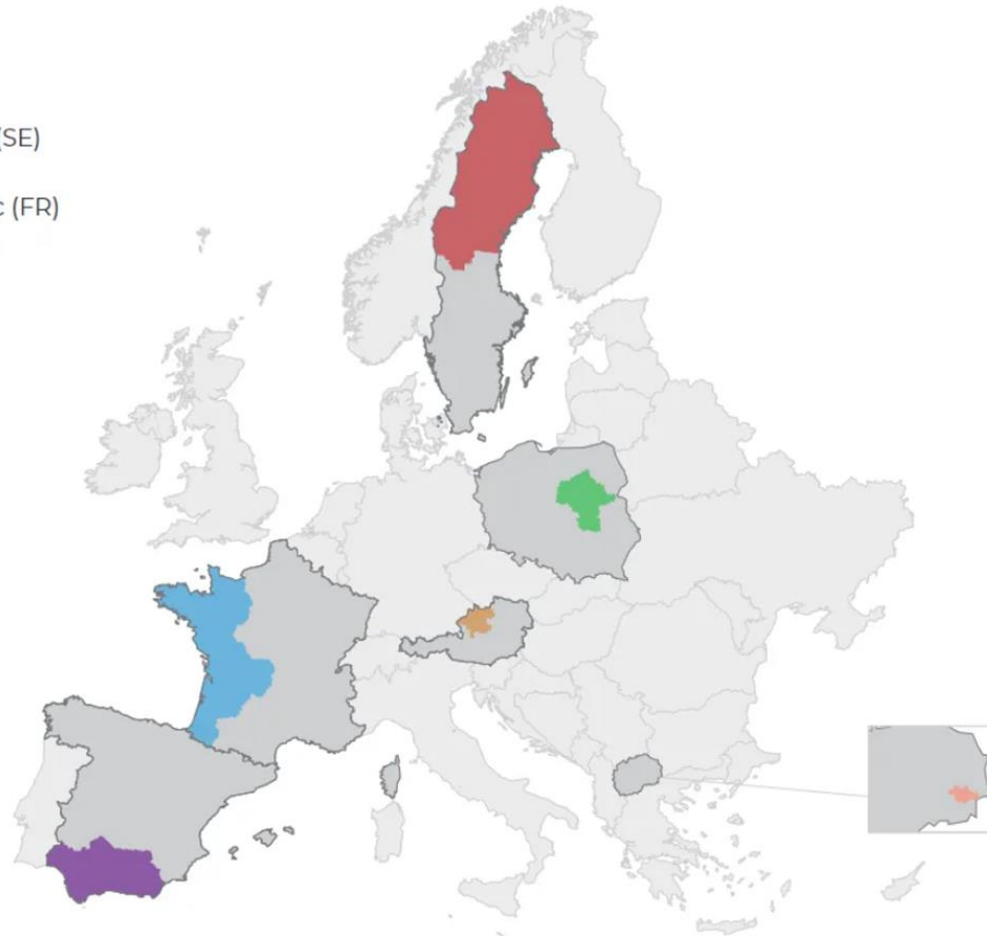
# FEEDBACK SESSION

Starts with 10 minutes Coffee Break  
Please come back soon !



**SCALE-UP regions**

- Northern Sweden (SE)
- Mazovia (PL)
- French Atlantic Arc (FR)
- Upper Austria (AT)
- Strumica (MK)
- Andalusia (ES)



**1. What are the biomass types available from your producers ? What is produced where ?**

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# CLOSING WORDS

SCALE<sup>UP</sup>  
community-driven  
bioeconomy development



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# THE **SCALE-UP** TRAINING PROGRAMME

A community-driven, needs-based training programme for bioeconomy development in European rural areas

**SAVE THE DATES !**

<p><b>EFFICIENT REGIONAL INFRASTRUCTURE &amp; BIOMASS LOGISTICS</b></p> <p><b>WS4</b> September &amp; October 2023 07.09.23 / 26.09.23 /19.10.23</p>	<p><b>INTEGRATING PRIMARY PRODUCERS INTO BIO-BASED VALUE CHAINS</b></p> <p><b>WS2</b> November &amp; December 2023 09.11.23 / 21.11.23 / 07.12.23</p>
<p><b>DIGITALISATION IN THE BIOECONOMY</b></p> <p><b>WS3</b> January &amp; February 2024 16.01.24 / 06.02.24 / 27.02.24</p>	<p><b>IMPROVED NUTRIENT RECYCLING</b></p> <p><b>WS1</b> March &amp; April 2024 12.03.24 / 04.04.24 / 23.04.24</p>
<p><b>PRACTICES OF „SOCIAL INNOVATIONS“ IN RURAL BIOECONOMIES</b></p> <p><b>WS5</b> May &amp; June 2024 14.05.24 / 04.06.24 / 25.06.24</p>	<p><b>GOVERNANCE OF REGIONAL BIO-BASED SYSTEMS</b></p> <p><b>WS6</b> September &amp; October 2024 05.09.24 / 26.09.24 /17.10.24</p>
<p><b>STRATEGIES TO ADDRESS SOCIAL, ECOLOGICAL AND ECONOMIC TRADE-OFFS IN REGIONAL BIOECONOMY DEVELOPMENT</b></p> <p><b>WS7</b> October, November &amp; December 2024 31.10.24 / 21.11.24 / 12.12.24</p>	

## WORK STREAM 2

### ***Integrating Primary Producers into Bio-Based Value Chains***

Link to Register :

<https://forms.gle/u7TQEAcC88ksRPSz6>

**SAVE THE DATES  
FOR THE NEXT  
SESSIONS !**



<b>SESSION #1</b> 09 November 2023 – 9 am to 12 am CEST
Production of biomass from Farmers and Foresters
<b>SESSION #2</b> 21 November 2023 – 9 am to 12 am CEST
Value chains and markets: linking producers and stakeholders
<b>SESSION #3</b> 07 December 2023 – 9 am to 12 am CEST
Innovations and challenges in production and mobilisation of biomass



# SHORT SURVEY

Links in the chat!



French



Polish



German



Swedish



Macedonian



Spanish



THANK YOU !

SEE YOU IN THE  
NEXT SESSION ...

SCALE<sup>UP</sup>  
community-driven  
bioeconomy development



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