



SUSTAINABLE USE OF LAND
AND NATURE BASED SOLUTIONS

AWARENESS AND OPENNESS

Report

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CONTENTS

INTRODUCTION	5
1. SWOT ANALYSIS	6
1.1 Methodology.....	6
1.2 Baia Mare Strengths, Weaknesses, Opportunities and Threats.....	8
1.2.1 Ecological & Environmental Dimension.....	8
1.2.2 Socio-Cultural, Health & Well-Being Dimensions	9
1.2.3 Land-Use, Built Environment & Strategic Assets.....	10
1.2.4 Economy & Labour Market.....	11
2. OPENNESS & AWARENESS SURVEY	12
2.1 Methodology	12
2.2 Survey Results	13
2.2.1 Phytoremediation and Biomass Upcycling	14
2.2.2 Dynamic Land-Use Management and Participatory Planning	16
2.2.3 Local Value Systems and Blockchain Support Services	17
CONCLUSIONS	20
REFERENCES	22
ANNEX 1. SURVEY RESULTS	23

TABLES AND FIGURES

Table 1 – Online Survey’s Questions13

Figure 1 – Health-Risks Awareness 14

Figure 2 – Openness to Grow Plants with Pollution Reduction Properties 14

Figure 3 – Openness to Collect and Donate Plant-Based Biomass15

Figure 4 –Awareness of Biomass Upcycling Possibilities15

Figure 5 – Openness to Dynamic Land-Use Visualisation Tools..... 16

Figure 6 – Openness to Participate to Co-Creation Workshops17

Figure 7 – Openness to Behavioural Change17

Figure 8 – Awareness of General Digital Technologies and Smartphones’ Use 18

Figure 9 – Openness to Digital Payment Systems18

Figure 10 – Openness to Blockchain-Based Local Value Systems 19

INTRODUCTION

Baia Mare is a municipality along the Săsar River, in north-western Romania. With a population of ca. 145.000 and a metropolitan area home to more than 230,000 residents, Baia Mare is the capital of the Maramureş county.

The city's **industrial past in the mining and metallurgical sector** left a legacy of approximately 627 ha of land polluted by HMs (up to 5 times the acceptable value) within the municipal boundaries, which is totally disconnected from the urban framework.

SPIRE - Smart Post-Industrial Regenerative Ecosystem proposes an innovative approach to the reuse of heavy metal-contaminated land in the city of Baia Mare, through adaptive phytoremediation and the creation of new urban ecosystems, as a long-term strategy for sustainable local economic development.

This Report builds on the findings of Deliverable D.4.3.3 *State of Play in Baia Mare. Desk analysis, Research Repository and Awareness Appraisal* (see Verga et al., 2020), as well as on the results of an online survey conducted in July 2020, and it provides a synthetic picture of the levels of awareness and openness of Baia Mare's civil society towards SPIRE's core dimensions and activities.

Starting from citizens' and stakeholders' opinions and perceptions, the Report ultimately aims at pinpointing, on the one hand which assets and opportunities can SPIRE tap on; as well as, on the other hand, what challenges and threats it needs to tackle.

To do so, the Report is divided in two core parts.

Chapter 1 draws on a set of interviews to- and focus groups with local stakeholders in order to identify the SWOT (Strengths, Weaknesses, Opportunities, and Threats) of the city, from the point of view of the following key dimensions:

- Ecological & environmental;
- Socio-cultural, health & well-being;
- Land-use, built environment & strategic assets;
- Economy & labour market

Chapter 2 analyses the results of a public survey to assess the level of awareness and openness among citizens in relation to the key ecosystem services that will be co-developed and implemented in Baia Mare: (1) phytoremediation and biomass upcycling; (2) dynamic land-use management and participatory planning; and (3) local value systems and blockchain support services.

Finally, in the **Conclusions** we discuss the implications of the Report's findings in the implementation of SPIRE.

1. SWOT ANALYSIS

This Chapter provides a SWOT (Strengths, Weaknesses, Opportunities, and Threats) of the city, from the point of view of four key dimensions for the SPIRE Project: 1) ecological & environmental; 2) socio-cultural, health & well-being; 3) land-use, built environment & strategic assets; and 4) economy & labour market.

This analysis builds on the outcomes of a set of interviews and focus groups conducted in Baia Mare with local stakeholders and privileged witnesses and serves both to anticipate potential barriers as well as to locally root the SPIRE local co-design process.

1.1 Methodology

This Chapter builds on the findings of Deliverable D.4.3.3 “*State of Play in Baia Mare. Desk Analysis, Research Repository and Awareness Appraisal*” (Verga et al., 2020), and interprets them within the framework of a thematic SWOT Analysis.

Accordingly, we rely on the information collected during a field visit in Baia Mare between 26th-29th November 2019, by means of seven semi-structured or open interviews and four thematic focus groups.

Semi-structured interviews were conducted with Florin Hosu, leader of the workers’ union Cartel Alfa; Florentin Tus, president of Maramureş’ Chamber of Commerce and Industry (CCI Maramureş); Adina Iuliana Cosma, director of Vasile Alecsandrii Secondary School; and Tamas Ioan Marin, director of Mihail Sadoveanu Secondary School.

Open, collective interviews were conducted with Silvia Florina Pop, Constantin Muresan and Violeta Horvat, respectively director of Nicolae Balcescu Secondary School, president of the Civic Council Freneziu de Sus, and representative of the Roma minority in the school’s Board of Directors; and with Todorut Victor, Orha Ioan and a ninth-grade student¹, respectively director, deputy director and students’ delegate of Transylvania Technical High School.

Focus groups were organised with pre-selected stakeholders, experts and privileged witnesses on the following topics:

- Focus Group 1 – Children and Youth in Baia Mare, with principals and teachers of local schools, as well as parents’ and students’ delegates;
- Focus Group 2 – Public Perceptions and Local Dynamics, with the director of the city’s Social Assistance Department; the chief of the Control Corps Service of Baia Mare’s Local Police Directorate; the citizens’ delegates of Firiza’s, Ferneziu’s and Vasile Alecsandrii’s neighbourhood councils; and local journalists;

¹ In order to protect the privacy of the underage students’ representative, their identity is kept confidential

- Focus Group 3 – Teenagers in Baia Mare, with fifteen students of the Nenitescu High School;
- Focus Group 4 – Perceptions, Practices and Expectations of the Youth in Baia Mare, with delegates from different associations part of Baia Mare’s Youth Federation.

The outcomes of the field work, and thereby the findings of D.4.3.3, constitute the backbone of this Chapter and serve to inform a schematic SWOT analysis of four key dimensions of the SPIRE Project:

- Ecological & environmental;
- Socio-cultural, health & well-being;
- Land-use, built environment & strategic assets;
- Economy & labour market

For each of these dimensions we pinpoint the key Strengths and Weaknesses as they were identified by the local stakeholders. Subsequently we infer the potential Opportunities and Threats that are either opened up or posed by such strengths and weaknesses.

The result of this operation consists of four thematic SWOT charts, which will serve as a guide to help anticipate potential barriers and locally root the SPIRE local co-design process.

1.2 Baia Mare Strengths, Weaknesses, Opportunities and Threats

This Section schematically reports the point of view of local stakeholders on the Strengths, Weaknesses, Opportunities and Threats (SWOT) of the city of Baia Mare along four key dimensions of the SPIRE Project: Ecological & environmental; Socio-cultural, health & well-being; Land-use, built environment & strategic assets; and Economy & labour market.

1.2.1 Ecological & Environmental Dimension

<p>Strengths</p> <ul style="list-style-type: none"> • Active role of schools in environmental education and awareness-raising • Cleaning activities organised by local schools and community • Strategies, policies and regulations at all governance levels aligned on environmental protection issues • Significant shares of the population with strong environmental sensibility and commitment • Awareness (and direct experience as visitors) among the youngest share of the population about West-European environmental standards and sustainable behaviours • Progressive improvement of air-quality • Positive assessment of quality and accessibility of natural spaces 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Severe soils' contamination inherited by the city's industrial past • Transfer of contaminants to fruit and vegetation • High levels of dependency on private cars • Non-centralised heating system, individual households tend to rely on coal stoves or other polluting heating sources • Low level of compliance with waste-sorting regulations • Widespread habit to dump garbage in the wilderness • Lack of design and usability of natural spaces • Low levels of maintenance of natural spaces • Low perceptions of safety and security in natural spaces
<p>Opportunities</p> <ul style="list-style-type: none"> • Transition towards a "green new deal" for the city of Baia Mare • Development / enhancement of a eco-friendly mindset in the local population • Recover and requalify abandoned or underused natural spaces • Enhance / develop collective ownership of places 	<p>Threats</p> <ul style="list-style-type: none"> • Lack of interest and low responsiveness to SPIRE's activities • Undesired practices and behaviours on newly developed pilot sites • Vandalisms, neglect, waste pollution • Lack of maintenance of newly created green spaces

1.2.2 Socio-Cultural, Health & Well-Being Dimensions

<p>Strengths</p> <ul style="list-style-type: none"> • Neighbourhood Councils • Youth associationism and Youth Federation • Local Universities • Local Hospital • Frequent social contacts and neighbouring relationships • Reactively easy to count on neighbours for basic support 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Pollution-related diseases affecting BM citizens • Contamination of fruits and vegetables cultivated in the proximity of pollution sources • Distorted perception of health risks related to HM soil pollution • Low usage of outdoor green/blue spaces • Reportedly bad quality and maintenance of green/blue spaces • Scarce availability of (quality) cultural/aggregation indoor spaces, especially in non-central neighbourhoods • Neighbouring relationships mostly based on weak ties, relatively hard to develop strong trust relationships • Overall low usage of public space for socialisation (malls tend to be the main gathering point)
<p>Opportunities</p> <ul style="list-style-type: none"> • Tap on local networks developed around the Neighbourhood Councils to reach high levels of participation in SPIRE's activities • Stimulating stronger sense of ownership (thereby use and care) of public spaces (e.g. through SPIRE's co-creation labs) • Characterise the SPIRE Hub as a new socialisation centrality for different generations of BM inhabitants 	<p>Threats</p> <ul style="list-style-type: none"> • Conflicts with and/or among social/ethnic groups during the planning and co-creation process • Conflicts over the use/modes of use of pilot sites with and/or between social groups • Diseases due to use of contaminated soils • Diseases due to consumption of fruits and vegetables grown on contaminated soils • Respiratory diseases due to bad air quality / air pollution

1.2.3 Land-Use, Built Environment & Strategic Assets

<p>Strengths</p> <ul style="list-style-type: none"> • Coherent Regulatory & Strategic Framework aimed at the remediation and regeneration of brownfields • Pilot sites in designated “development areas” • Public ownership of large brownfield areas 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Informal settlements (makeshift barracks, no utilities, poor hygienic conditions) • Areas at risk of flooding • Low quality of housing • Lack of investors
<p>Opportunities</p> <ul style="list-style-type: none"> • Recover / reclaim abandoned/underused areas • Attract new investors (both real estate and business/industrial) • Characterise BM as the new green capital of Romania • Retrofit and requalify build environment and housing stock • Large-scale urban regeneration and development process (long-term) 	<p>Threats</p> <ul style="list-style-type: none"> • Conflicts with dwellers of informal settlements • Conflicts with neighbouring owners and stakeholders • Long-lasting abandonment and increasing dereliction of brownfields and industrial heritage

1.2.4 Economy & Labour Market

<p>Strengths</p> <ul style="list-style-type: none"> • Increasing number of youths in higher education • Growing number of local businesses • Well-developed IT sector 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Low salaries and low household income • High rate of single-income households • Mismatch of required and available skills • Perceived hardship in finding a decent job • Reportedly low self-entrepreneurship attitude • High costs for setting up a business • Population's ageing and youth's outmigration
<p>Opportunities</p> <ul style="list-style-type: none"> • Transition to a new economic/productive framework • Creation of a start-up and innovation pole in BM 	<p>Threats</p> <ul style="list-style-type: none"> • Outmigration • Lack of interest in SPIRE's mentoring activities • Lack of entrepreneurs for start-ups

2. OPENNESS & AWARENESS SURVEY

This Chapter presents the results of an online public survey carried out in July 2020 in order to assess the level of awareness and openness among citizens, in relation to the key ecosystem services which will be co-developed and implemented by the SPIRE Project in Baia Mare.

The outcomes of the survey will be instrumental to fine-tune SPIRE's participatory activities in order to better adapt and respond to citizens' knowledge, expectations, and needs.

2.1 Methodology

Despite originally foreseen as a face-to-face survey to the citizenry to be carried out in Baia Mare over a longer time span, the Covid-19 pandemic and the consequent physical distancing measures imposed to switch to a quick, online-based solution.

Accordingly, we launched an online survey through Google Forms, targeting an audience of citizens living and/or working within the boundaries of Baia Mare Metropolitan Area.

Preceded by a "scrimmage" question to filter those who did not match our target, the survey was organised along a set of ten questions. Respondents were asked to answer each item on a 7-point Likert-type scale (1 = not at all; 7 = very much).

The list of questions in Romanian accompanied by their translation into English is reported in Table 1.

The online survey was disseminated through the official social media channels of the SPIRE Project (Facebook, LinkedIn, and Twitter)² and those of its Delivery Partners.

Responses were accepted for a period of ten days, between the 7th and 16th of July 2020, included. In this timespan, the survey's launch post on SPIRE official social media channels reached the following audience:

- Facebook: 2656 impressions; 195 reactions; 50 shares
- LinkedIn: 51 impressions; 5 reactions; 5 shares
- Twitter: 49 impressions; 2 reactions

At the closure of the survey, we recorded a total of 144 responses to the first "scrimmage" question "*Do you live and/or work within Baia Mare Metropolitan Area?*". Only the 118 respondents who answered "Yes" were allowed to continue the survey, and thereby constitute our sample.

² SPIRE official social media accounts can be accessed at the following links:

- Facebook: <https://www.facebook.com/UIASPIRE/>
- LinkedIn: <https://www.linkedin.com/company/spire-baia-mare/>
- Twitter: <https://twitter.com/SpireBaiaMare>

Question Nr.	Original Question (Romanian)	Translated Question (English)
1	Pe o scară de la 1 la 7, cât de mult vă este teamă că sănătatea dvs. ar putea fi afectată de contaminarea solului și poluarea mediului înconjurător?	On a scale of 1 to 7 how much you are afraid that your health could be affected by soil contamination and environmental pollution?
2	Pe o scară de la 1 la 7, cât de dispus ați fi să vă folosiți grădina pentru a cultiva plante cu proprietăți care reduc poluarea?	On a scale of 1 to 7 how willing would you be to use your garden to grow plants with properties that reduce pollution?
3	Pe o scară de la 1 la 7, în ce măsură ați fi dispus să colectați biomasa rezultată de la plante și să o donați în scopuri sociale / comunitare (de exemplu, pentru încălzirea unei școli)?	On a scale of 1 to 7 to what extent would you be willing to collect plant-based biomass and donate it for social / community purposes (e.g. for heating a school)?
5	Pe o scară de la 1 la 7, în ce măsură considerați că aveți cunoștințe despre utilizarea și reciclarea biomasei vegetale?	On a scale of 1 to 7, to what extent do you consider that you have knowledge on the reuse and recycling of plant biomass?
5	Pe o scară de la 1 la 7, în ce măsură sunteți interesat să vizualizați cum se schimbă utilizarea terenului în orașul dvs. și să aveți acces public la monitorizarea calității mediului?	On a scale of 1 to 7, to what extent are you interested in visualising how land use changes in your city and having public access to monitoring the quality of the local environment?
6	Pe o scară de la 1 la 7, cât de dispus sunteți să participați la ateliere de co-creare și proiectare a spațiilor publice și verzi din Baia Mare?	On a scale from 1 to 7, how willing are you to participate in workshops for co-creation and design of public and green spaces of Baia Mare?
7	Pe o scară de la 1 la 7, cât de dispus ați fi să vă schimbați comportamentul și obiceiurile zilnice în beneficiul mediului? (de exemplu: colectarea selectivă a deșeurilor, trecerea la energia regenerabilă pentru încălzire, trecerea la mijloace nepoluante sau de transport public)	On a scale of 1 to 7, how willing would you be to change your daily behavior and habits for the benefit of the environment? (eg selective waste collection, transition to renewable energy for heating, switch to non-polluting or public transportation means)
8	Pe o scară de la 1 la 7, cât de familiar sunteți cu utilizarea telefoanelor inteligente (smartphone) și a tehnologiilor digitale în general?	On a scale of 1 to 7 how familiar are you with the use of smartphones and digital technologies in general?
9	Pe o scară de la 1 la 7, cât de dispus ați fi să folosiți un sistem de recompense digitale (token digital) pentru a efectua plăți zilnice în Baia Mare?	On a scale from 1 to 7, how willing would you be to use a digital token system to make daily payments in Baia Mare?
10	Pe o scară de la 1 la 7, cât de dispus ați fi să participați la co-crearea unui sistem de valori locale pentru practici ecologice, bazat pe tehnologia blockchain iLEU?	On a scale of 1 to 7, how willing would you be to participate in the co-creation of a system of local values for ecological practices, based on the iLEU blockchain technology?

Table 1 – Online Survey's Questions

2.2 Survey Results

The results of our online survey provide an initial picture of how citizens living and/or working within Baia Mare Metropolitan Area are aware of- and familiar with- SPIRE's fields of action and technologies of choice, as well as of how much they are willing to directly participate and contribute to project actions and goals. In other words, these results set the baseline for the levels of awareness and openness of the citizenry towards SPIRE's topics, activities and objectives. Thereby their usefulness is twofold: on the one hand these results will inform and guide the project team in the fine-tuning of SPIRE's activities on the ground; on the other hand they will allow us to monitor the progress of the levels of citizens' awareness and openness over the life of the project.

The survey's questions are organised along three thematic groups, corresponding to SPIRE's main fields of action: (1) phytoremediation and biomass upcycling; (2) dynamic land-use management and participatory planning; and (3) local value systems and blockchain support services. Accordingly, the results will be analysed following this categorisation.

2.2.1 Phytoremediation and Biomass Upcycling

The first group of questions aims at understanding the standpoint of the local community on SPIRE's environmental challenges and its proposed nature-based solutions. Hence, we assess citizens' perception of health risks due to soil contamination and environmental pollution; their willingness to directly contribute to the project goals by taking voluntary actions; as well as their knowledge of the potential uses and applications of plant biomass.

First, as Figure 1 shows, the absolute majority of respondents (70,3%) is afraid that their personal health could be affected by soil contamination and environmental pollution, yet the remaining 30% is either neutral (15,3%) or not concerned (14,4%) by the health threat.

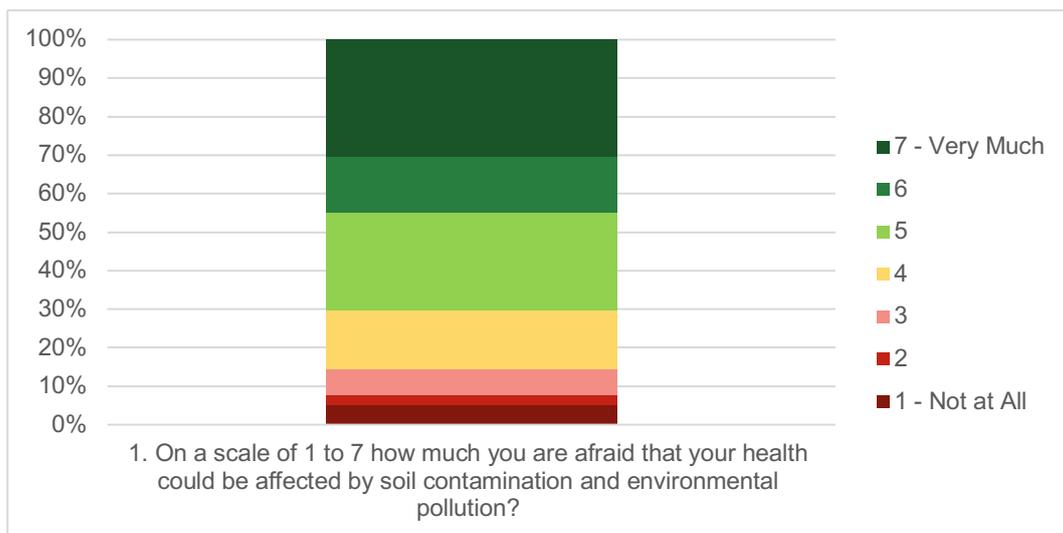


Figure 1 – Health-Risks Awareness

Second, respondents appear to be extremely keen to voluntarily take individual action and contribute to the project goals: Figure 2 illustrates that nearly 90% of citizens is willing to use their own garden to grow plants with properties that reduce pollution; and Figure 3 shows that more than 80% would collect their own plant-based biomass and donate it for social or community purposes.

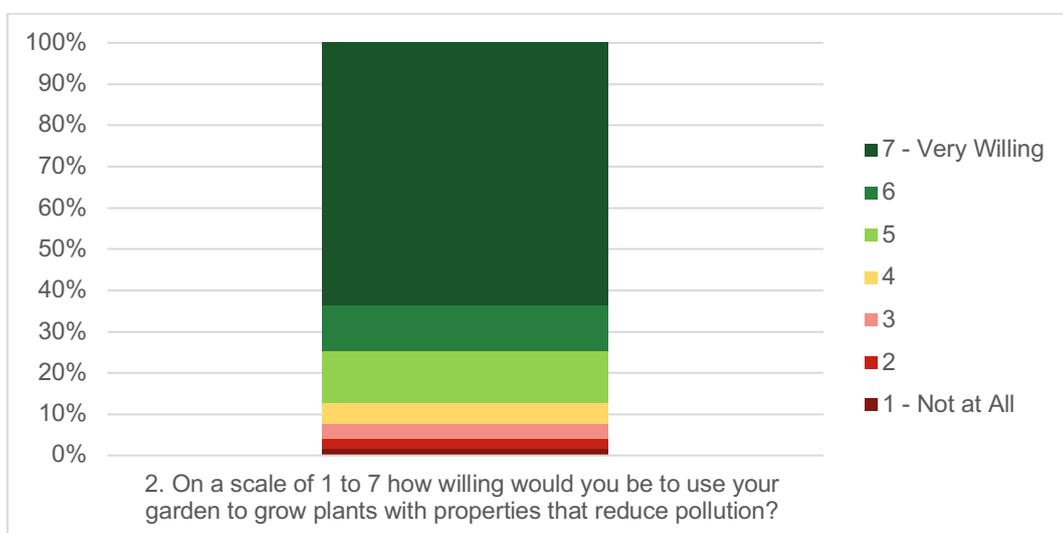


Figure 2 – Openness to Grow Plants with Pollution Reduction Properties

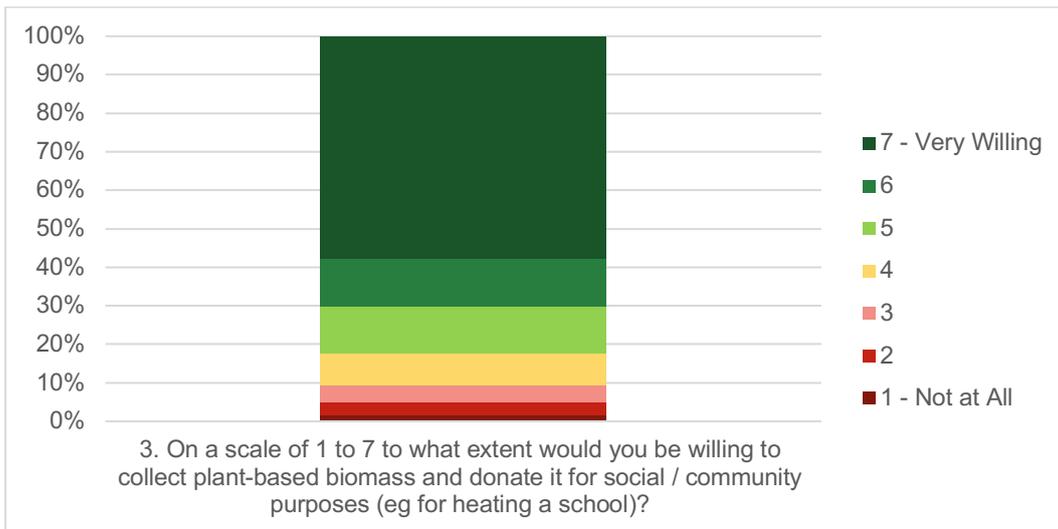


Figure 3 – Openness to Collect and Donate Plant-Based Biomass

Third, despite their openness to collect and donate their plant-based biomass, citizens seem to be rather unaware about the upcycling potential and possible secondary uses of such biomass. In fact, Figure 4 unveils that only 28% of the population has some knowledge on the matter, whereas more than 60% has little to no information on the reuse and recycling of plant biomass.

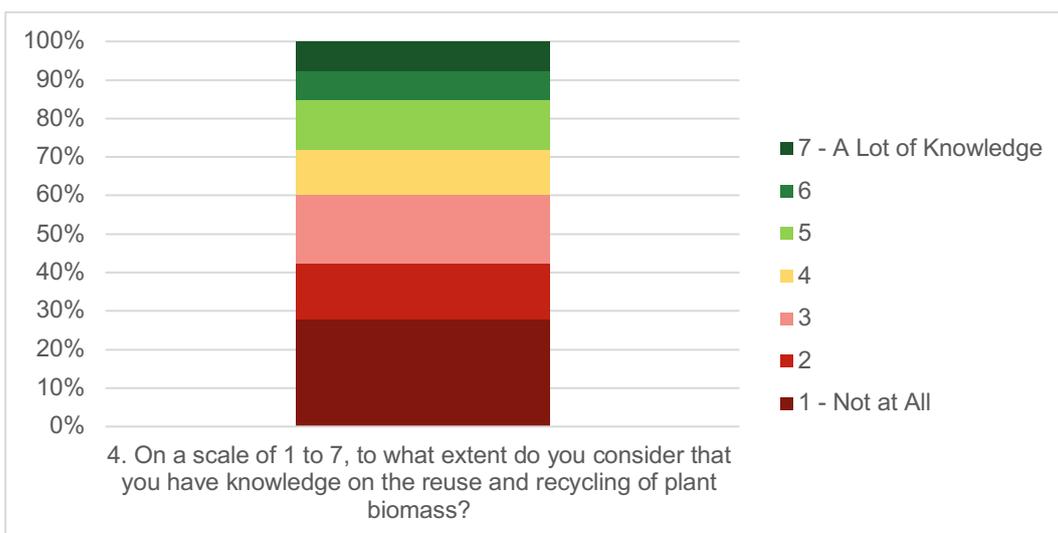


Figure 4 – Awareness of Biomass Upcycling Possibilities

Overall, these results inform that soils’ contamination and environmental pollution are strongly perceived as a threat to personal health, and that the population is open and willing to voluntarily adopt nature-based solutions to the mitigation of such risk. Moreover, citizens are also open to collect and donate their own plant-based biomass. Yet there is a general lack of knowledge on its possible secondary uses and upcycling potential, thereby SPIRE’s communication and capacity building activities will be crucial to raise awareness on the matter.

2.2.2 Dynamic Land-Use Management and Participatory Planning

The second chunk of questions investigates citizens' interest towards having first-hand information on the environmental and land-use situation of the city, as well as their openness to join and contribute to participatory workshops.

Among its digital solutions, tools and services, SPIRE launched the iGIS: a technical tool used for education, gamification, assessment and measuring of project KPIs. The platform leverages on Remote sensed data, ground truth, scientific indexes and Artificial Intelligence (AI) in order to provide a complete overview of the intervention area, as well simulations of impact of replication in further areas using AI. Multimedia tools will enable visualization for students and local stakeholders, enabling them to simulate effects of actions and understand specific NBS and processes.

The results of our survey show a great potential for the adoption and use of the iGIS by the population in Baia Mare. In fact, Figure 5 unveils that more than 86% of respondents would be interested in visualising the city's land-use changes as well as in monitoring the quality of the local environment.

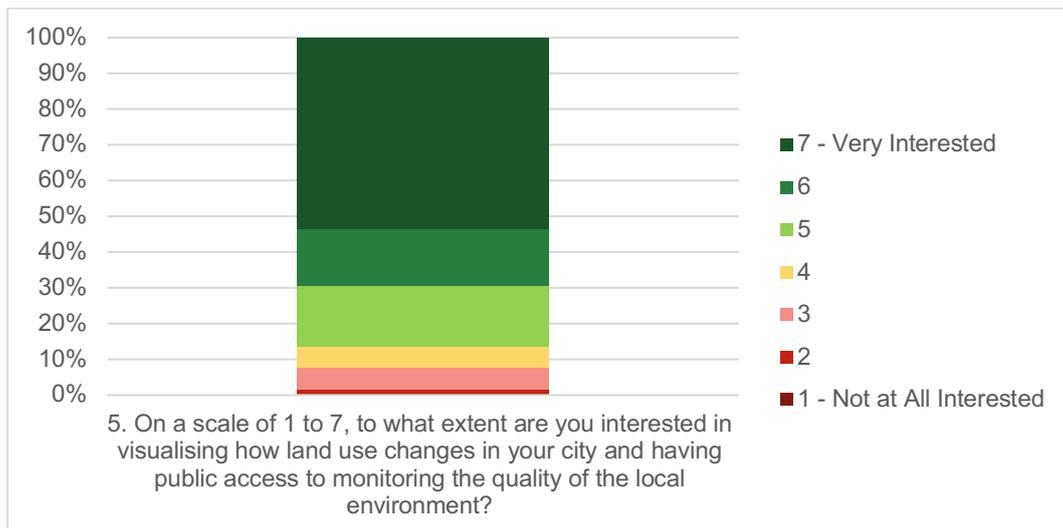


Figure 5 – Openness to Dynamic Land-Use Visualisation Tools

Furthermore, our survey's participants expressed a good deal of interest and willingness to join the co-creation workshops that are to be organised for the participatory design of the landscaping projects for SPIRE's phytoremediation pilot sites. Precisely, Figure 6 shows that nearly 75% of respondents would be willing to take part in such initiatives, while slightly more than 15% would be neutral and circa 9% would rather not participate.

Against this background we can reasonably expect a high degree of attractiveness and adoption for the iGIS geographical information system, as well as a good level of citizens' participation to SPIRE's co-creation workshops and laboratories. Nonetheless, it would be important to keep high the level of interest towards SPIRE throughout the whole duration of the project, as well as to undertake a continuous stimulation effort to further increase citizens' involvement and participation.

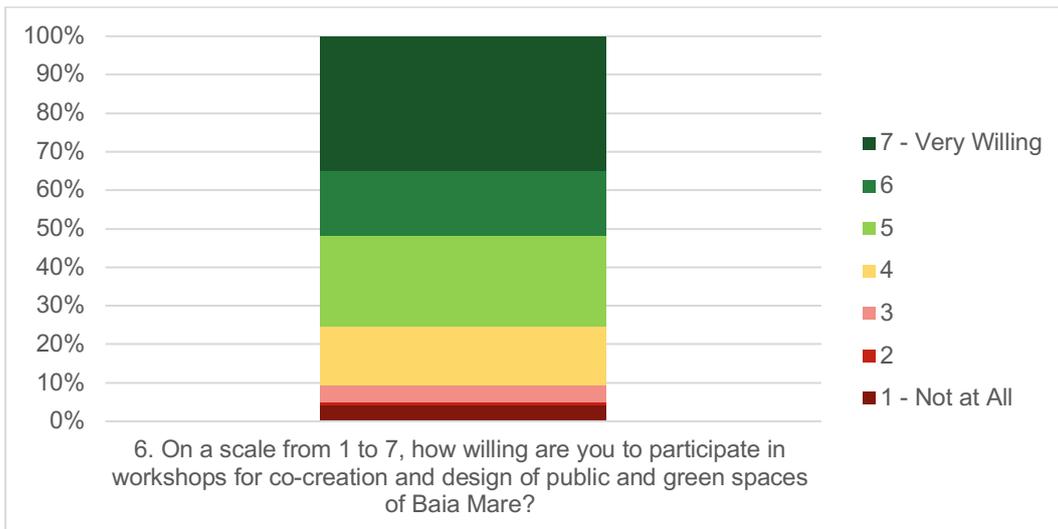


Figure 6 – Openness to Participate to Co-Creation Workshops

2.2.3 Local Value Systems and Blockchain Support Services

The third and final block of questions examines citizens’ openness to collaboratively develop a shared local value system and to enact individual progressive behavioural change, as well as their savviness with digital technologies and their willingness to adopt innovative blockchain solutions.

In this respect, the results of our survey are rather encouraging as very high levels of openness and awareness were registered across all questions.

The first very promising information, illustrated in Figure 7, is that nearly 95% of the respondents declared to be willing or very willing to change their daily behaviour and habits for the benefit of the environment. Additionally, Figure 8 shows a very high level of savviness with smartphones and digital technologies, with nearly 97% of respondents claiming to be familiar or very familiar with such tools.

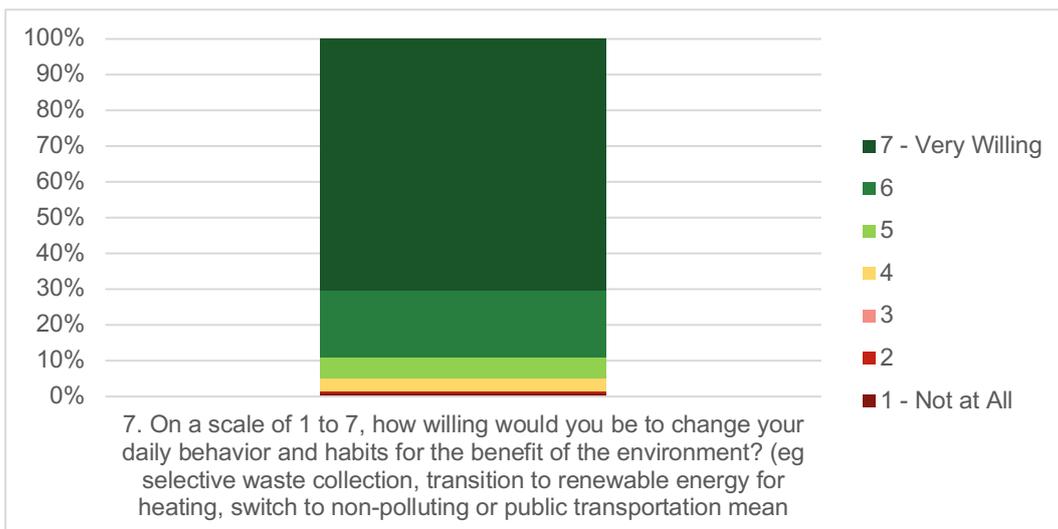


Figure 7 – Openness to Behavioural Change

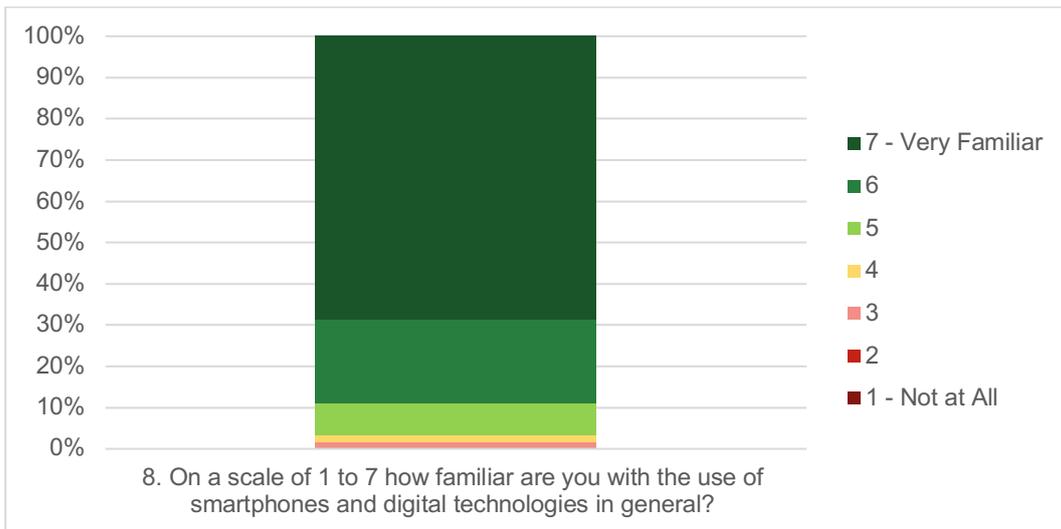


Figure 8 – Awareness of General Digital Technologies and Smartphones’ Use

The high levels of openness towards behavioural change and familiarity with digital technologies and smartphones are also reflected in the willingness of our survey’s respondents to favourably receive the innovative solutions brought forward by SPIRE with the iLEU.

On the one hand, Figure 9 illustrates that slightly more than 82% of our target sample would be willing to use a digital token system to make payments in their daily life in Baia Mare, while nearly 8% is neutral and circa 10% would refrain from doing so.

On the other hand, Figure 10 unveils that 78% of the respondents is open to participating in the co-creation of local value system based on blockchain technology. Here, however, we register a higher level of scepticism towards this type of instrument, with 22% of the population declaring to be either neutral (13%) or not willing (9%) to adopt it.

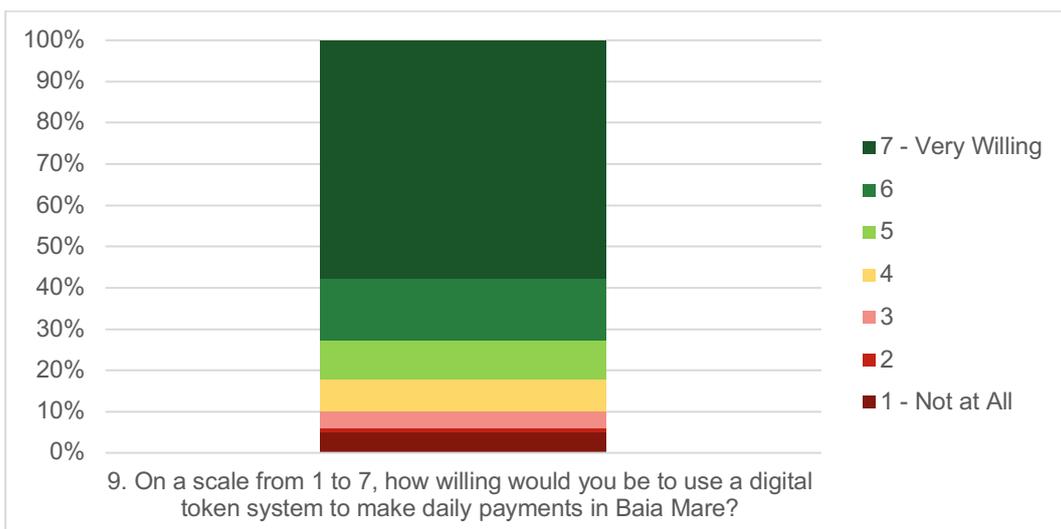


Figure 9 – Openness to Digital Payment Systems

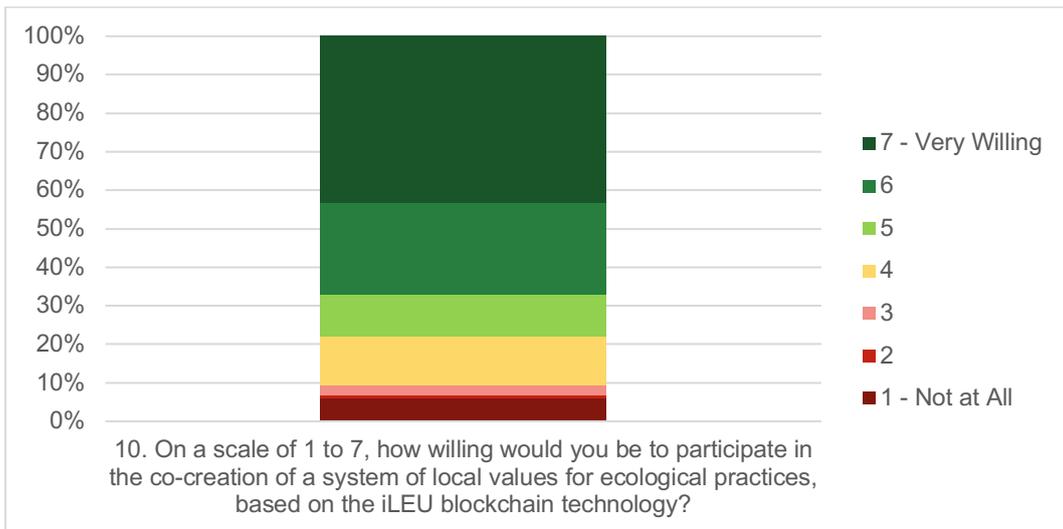


Figure 10 – Openness to Blockchain-Based Local Value Systems

In conclusion, our survey unveiled relatively high levels of awareness on- and openness towards most of SPIRE’s core topics and proposed actions. Nonetheless, we also registered a general lack of knowledge concerning the upcycling and potential reuses of plant biomass, as well as an overall scepticism towards co-creation and participatory activities (i.e. the co-design workshops and the collaborative development of a local value system).

The aforementioned negative results, however, do not compromise the implementation of the project. Rather, they indicate the way where additional effort would be required to ultimately fully achieve SPIRE’s goals and objectives.

CONCLUSIONS

In this Report we analysed the levels of awareness and openness of local stakeholders and citizens with respect to the key domains and fields of intervention of the Urban Innovative Actions project SPIRE.

In Chapter 1 we inferred what are – from the point of view of local stakeholders – the main Strengths, Weaknesses, Opportunities and Threats (SWOT) of Baia Mare under the Ecological and Environmental; Socio-Cultural, Health and Well-Being; Land-Use, Built Environment and Strategic Assets; and Economy and Labour Market dimensions.

In Chapter 2 we presented the results of an Online Public Survey aimed at assessing the level of awareness and openness among citizens, in relation to the key ecosystem services which will be co-developed and implemented by the SPIRE Project in Baia Mare.

The findings of the thematic SWOT analyses and of the Online Public Survey allow us to pinpoint the following conclusive remarks on the adaptation and moulding of SPIRE's activities to the characteristics of Baia Mare citizens and stakeholders.

First, we identify a window of opportunity for a transition towards a “green new deal” in Baia Mare, with the possibility to enhance citizens' and stakeholders' eco-friendly mindset, trigger the recovery process for abandoned/underused natural spaces as well as to enhance the collective ownership of public places. These assumptions are also backed by the online public survey's results, which in fact reveal that the environmental issue is of major concern for the population, as well as that Baia Mare citizens are willing and open to individually adopt nature-based solutions and enact behavioural change geared towards the improvement of the local environmental situation. Moreover, our research pinpoints the crucial role that schools, teenagers and local youths up to circa 35/40 years of age do and potentially could play in this “green” transition.

On the flipside, however, the lack of interest towards the project (especially among the older generations and groups living in vulnerable conditions), as well as the emerging of undesired practices, acts of neglect and vandalism, and lack of maintenance of the newly developed pilot sites arose as concrete risks for the project.

Consequently, SPIRE will need to work closely with schools, teenagers and youth, not only in the development and implementation of project activities, but also to generate awareness and consensus around the project and its topics among less receptive groups. Therefrom it will be possible to build a broad critical-mass to support the spreading of SPIRE's nature-based solutions and eco-friendly approach to local development. In this perspective, the existing neighbourhood councils and the forthcoming SPIRE Hub in Casa Schreiber will be pivotal to further anchor and connect the project with the local population.

Second, both the SWOT analysis and the survey show a rather “individualistic” attitude among the population, which tends to be scarcely open to actively take part in collective activities. This could potentially undermine the success of SPIRE's participatory activities, such as the co-creation

workshops, the development of the blockchain value system, or other communal/collective initiatives. Nonetheless, as it has been proved in numerous other participatory-planning experiences across Europe, broad citizens' involvement engagement is a result that can be achieved to be over time by means of a constant dialogical effort with the population. Thereby, a specific and continuous effort will be required to build a solid trust relationship with the community, possibly also relying on the collaboration of local leaders and neighbourhood-based institutions as proxies between the SPIRE project team and its target groups.

Third, apart from an overall savviness with standard digital technologies (i.e. smartphones and the Internet in general), the concepts underlying SPIRE's key innovations such as ecosystem services, digital token systems, dynamic land-use, and biomass secondary uses, seem to be rather foreign to the local population. In this respect, different degrees of educational and dissemination activities targeted to different components of the local society will be crucial to raise awareness on the features and, even more importantly, on the potential benefits of such innovation at both individual and collective level.

Fourth, we registered a steady outmigration trend whereby local youth tend to leave Baia Mare at the end of their secondary education path in pursue of higher education and/or better career opportunities in other cities or countries. This trend, coupled with a reportedly overall scarce openness to self-entrepreneurialism among the local population, may challenge the success of SPIRE's mentoring activities and start-up facilitation programme. Yet again, showing the potential gains and benefits of the project through a careful outreach and awareness-raising effort – especially targeting the local teenagers and youth using schools and community leaders as proxies – will be crucial to the achievement of SPIRE's goals.

To conclude, our analysis highlighted the great transformative potential of the SPIRE project and a general openness of the local society to align with the project's objectives, especially those related to the improvement of the local environmental situation. Citizens appear willing to enact environmentally positive behavioural change, as well as to adopt small-size nature-based solutions at individual level, as well as to make use of innovative digital tools. On the contrary, we reported lower levels of willingness to take active part in collective/participatory activities; a scarce propel towards self-entrepreneurship as well as an overall lack of awareness about SPIRE's key innovation fields. Yet, citizens' broad engagement and participation, a self-entrepreneurship culture, and knowledge about ground-breaking innovative concepts, all require to be carefully developed over time.

Accordingly, it will be crucial to dedicate specific efforts to start a continuous dialogical process with the local population and stakeholders, geared to the stimulation and enhancement of a solid consensus-base, critical mass and community of engaged participants around the SPIRE Project.

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ANNEX 1. SURVEY RESULTS

QUESTION	SCORE														TOTAL		AVERAGE SCORE
	1	%	2	%	3	%	4	%	5	%	6	%	7	%	TOT	%	
1. On a scale of 1 to 7 how much you are afraid that your health could be affected by soil contamination and environmental pollution?	6	5,1%	3	2,5%	8	6,8%	18	15,3%	30	25,4%	17	14,4%	36	30,5%	118	100,0%	5,2
2. On a scale of 1 to 7 how willing would you be to use your garden to grow plants with properties that reduce pollution?	2	1,7%	3	2,5%	4	3,4%	6	5,1%	15	12,7%	13	11,0%	75	63,6%	118	100,0%	6,1
3. On a scale of 1 to 7 to what extent would you be willing to collect plant-based biomass and donate it for social / community purposes (eg for heating a school)?	2	1,7%	4	3,4%	5	4,2%	10	8,5%	14	11,9%	15	12,7%	68	57,6%	118	100,0%	5,9
4. On a scale of 1 to 7, to what extent do you consider that you have knowledge on the reuse and recycling of plant biomass?	33	28,0%	17	14,4%	21	17,8%	14	11,9%	15	12,7%	9	7,6%	9	7,6%	118	100,0%	3,2
5. On a scale of 1 to 7, to what extent are you interested in visualising how land use changes in your city and having public access to monitoring the quality of the local environment?	0	0,0%	2	1,7%	7	5,9%	7	5,9%	20	16,9%	19	16,1%	63	53,4%	118	100,0%	6,0

QUESTION	SCORE														TOTAL		AVERAGE SCORE
	1	%	2	%	3	%	4	%	5	%	6	%	7	%	TOT	%	
6. On a scale from 1 to 7, how willing are you to participate in workshops for co-creation and design of public and green spaces of Baia Mare?	5	4,2%	1	0,8%	5	4,2%	18	15,3%	28	23,7%	20	16,9%	41	34,7%	118	100,0%	5,4
7. On a scale of 1 to 7, how willing would you be to change your daily behavior and habits for the benefit of the environment? (eg selective waste collection, transition to renewable energy for heating, switch to non-polluting or public transportation means)	1	0,8%	1	0,8%	0	0,0%	4	3,4%	7	5,9%	22	18,6%	83	70,3%	118	100,0%	6,5
8. On a scale of 1 to 7 how familiar are you with the use of smartphones and digital technologies in general?	0	0,0%	0	0,0%	2	1,7%	2	1,7%	9	7,6%	24	20,3%	81	68,6%	118	100,0%	6,5
9. On a scale from 1 to 7, how willing would you be to use a digital token system to make daily payments in Baia Mare?	6	5,1%	1	0,8%	5	4,2%	9	7,6%	11	9,3%	18	15,3%	68	57,6%	118	100,0%	5,9
10. On a scale of 1 to 7, how willing would you be to participate in the co-creation of a system of local values for ecological practices, based on the iLEU blockchain technology?	7	5,9%	1	0,8%	3	2,5%	15	12,7%	13	11,0%	28	23,7%	51	43,2%	118	100,0%	5,7

