

NEWS

PROJECT

SPIRE - Smart Post-Industrial Regenerative Ecosystem

📍 Baia Mare, Romania

TOPIC

Sustainable use of land and nature based solutions

EDIT 17 FEBRUARY 2021
BY AMAYA CELAYA ALVAREZ

Creating new social and economic value: Restoring the urban ecosystem

See on UIA website



This article is the first to review Baia Mare and the SPIRE project (Smart Post-Industrial Regenerative Ecosystem), financed under the 4th call of the Urban Innovative Action (UIA) Initiative.

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

The city is currently transitioning from its past as **Romania's mining capital** towards a **new sustainable social, economic and environmental development model**. The last metallurgical factory closed in 2012 and, the city is now coping with a **multi-dimensional set of challenges** (including economic decline, depopulation, and environmental pollution). On top of the socio-economic consequences of the closure of the core productive system in the city, the mining and metallurgic industries left a legacy of circa 627 hectares of land polluted by heavy metals (up to 5 times the acceptable value) within the metropolitan area. Such land is now disconnected from the urban framework and a danger to the inhabitants and the environment; nonetheless, it is also an essential resource for the regeneration and sustainable economic development of Baia Mare's urban system.

The **SPIRE** project, following the triple bottom line (TBL), initially tackles the challenges urban ecosystems suffer at the **nexus of the economy-society-environment**. It seeks to apply adaptive phytoremediation to contaminated land (environmental lens), to generate a new and dynamic land-use management through participatory planning (social lens), and to create new local value systems (economic lens).

Restoring the urban ecosystem

Nowadays, when concerns about **depletion of natural resources** - air, soil, water pollution - and the climate crisis are a starting point, techniques that go beyond the conventional restoration of degraded land (physical remediation) are more cost-effective, environmentally friendly, and timely. The SPIRE project provides fundamental evidence-based analysis and data for applying correct and accurate management practices, with a special focus on obtaining feasible solutions.

A selection of representative pilot sites are being tested to assess an innovative **regenerative urban ecosystem concept** within a 3-year implementation time. Five (5) planned pilot sites in Baia Mare are being revegetated through the **SPIRE** project, aiming to achieve the following:

1. Ensure phytoremediation: prevent vertical migration of pollutants and remove the heavy metals in time by using hyperaccumulator plants that can perform phytoextraction;
2. Obtain biomass from energy plants;
3. Integrate existing plant species that currently perform phytoremediation at the pilot sites in the landscaping plan because these are well-adapted to the local conditions;
4. Return these sites to the local community by making them attractive through landscaping and by providing a safe outdoor space;
5. Ensure cascading ecosystem services or secondary valorization options.

The [re-naturing plan](#) strongly relied on these objectives when selecting the plant assortment. Phytoremediation technics will be optimally performed by tailoring plant-selection per pollutant from each location.



Fig. 2: Pilot site URBIS. Source: Baia Mare Municipality

Building social resilience

The SPIRE [social lens](#) builds upon a **strategic multi-stakeholder framework** that aims to transform the current administrative archetype into a new co-governance model. It is important to remark that the project is progressing with its working plan despite the challenging pandemic scenario. The SPIRE team designed several online activities to tackle the local community's potential awareness and involvement in the approach.

Due to COVID-19, the co-design and co-creation strategy have so far involved online workshops with citizens, and an online questionnaire addressed to Baia Mare inhabitants. A [public survey](#) was launched to assess the **level of awareness and openness among citizens** concerning the critical 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. Answers were accepted on Facebook, LinkedIn, and Twitter. The results set the baseline for the citizenry's levels of awareness and openness towards SPIRE's topics, activities, and objectives:

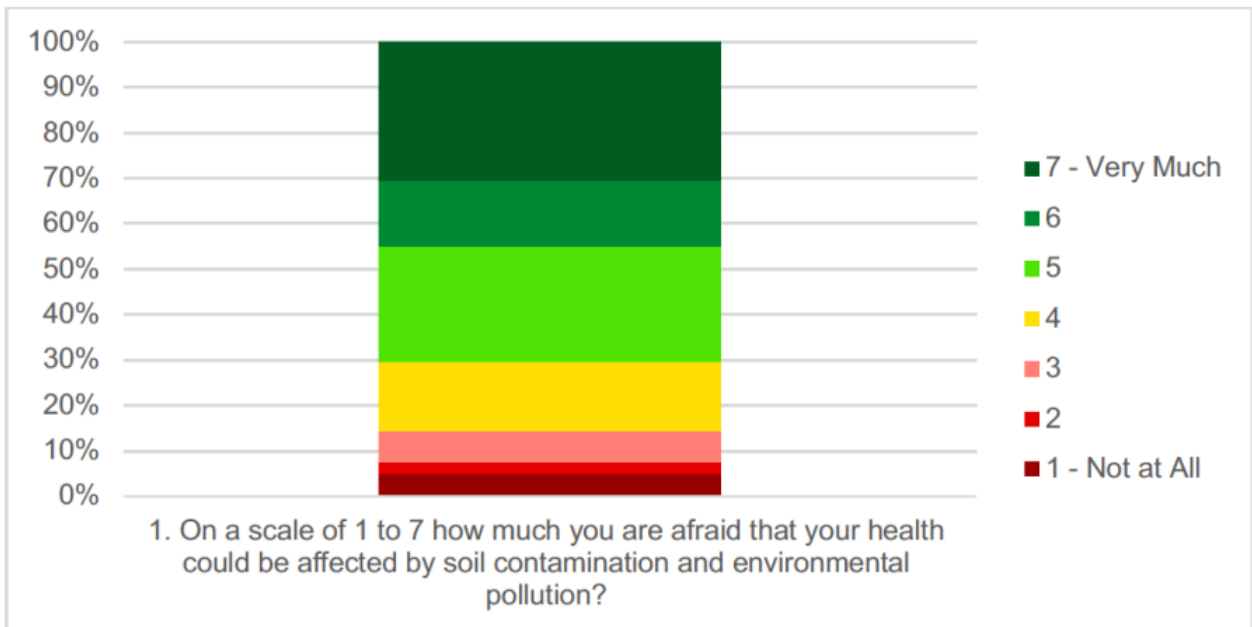


Fig. 3: Health-Risks Awareness. Source: SPIRE Awareness and openness report.

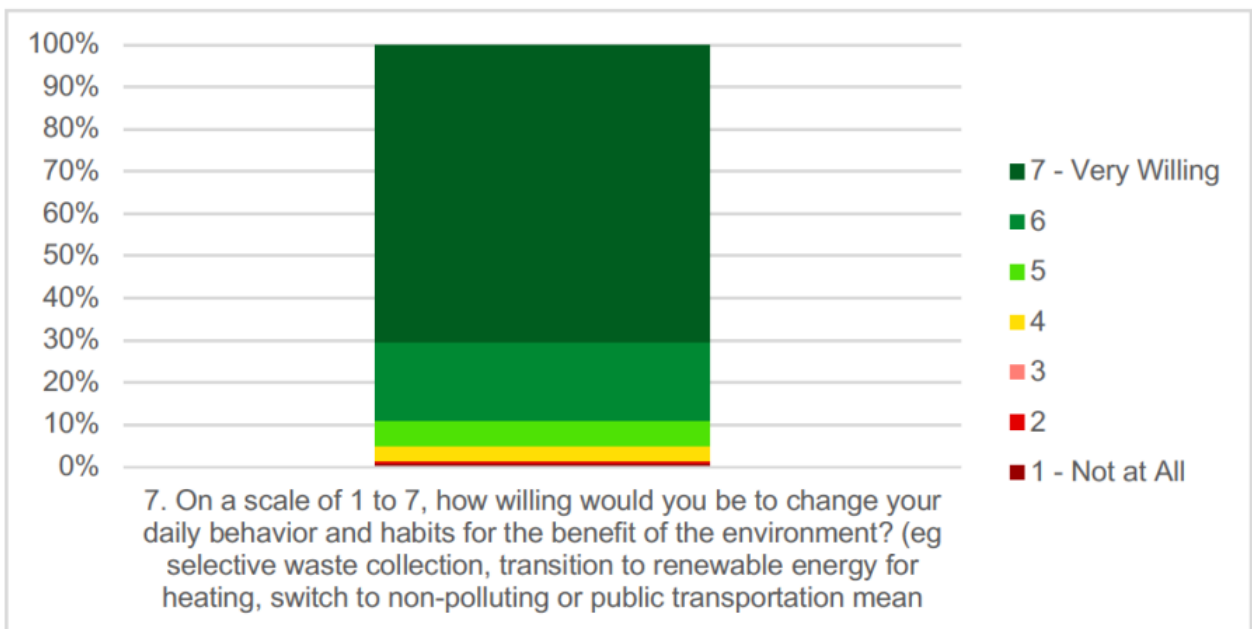


Fig. 4: Openness to Behavioural Change. Source: SPIRE Awareness and openness report.

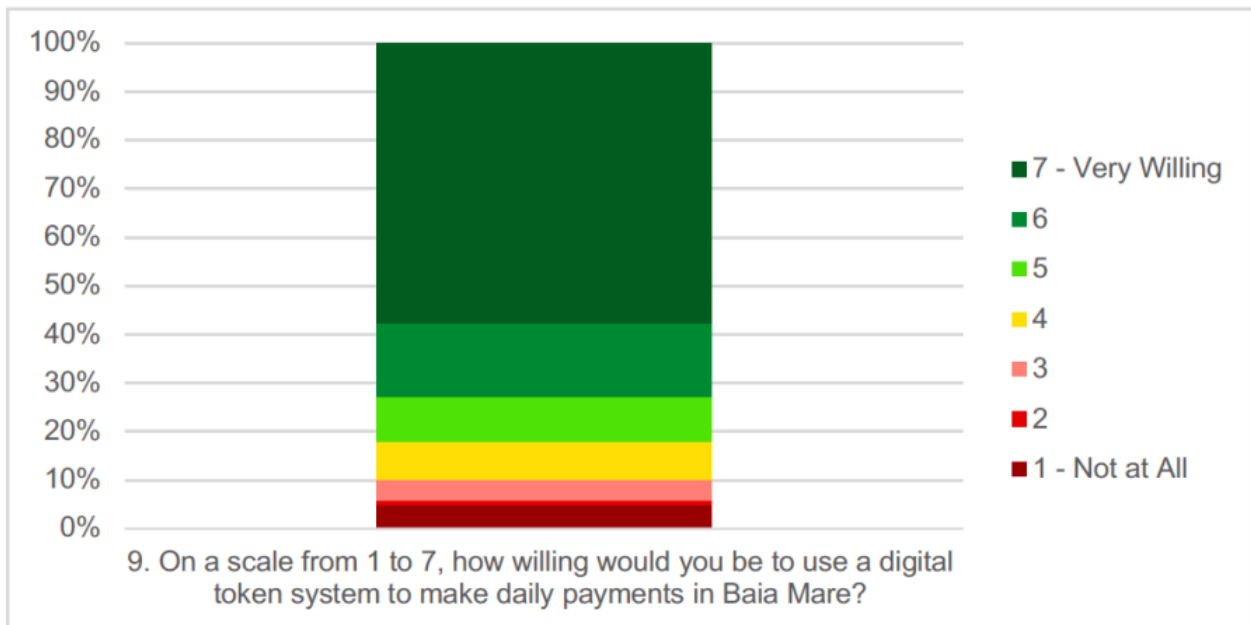


Fig. 5: Openness to Blockchain-Based Local Value Systems. Source: SPIRE Awareness and openness report.

The [survey](#) unveiled relatively high awareness and openness towards most of the project's core topics and proposed actions. It also found a general lack of knowledge concerning the upcycling and potential reuses of plant biomass.

The environmental issue was revealed as of significant concern for the population and a willingness to individually adopt nature-based solutions and enact behavioral change geared towards improving the local environmental situation was demonstrated.

Despite some initial skepticism towards co-creation and participatory activities, a window of opportunity for a transition towards a "green new deal" has been identified in Baia Mare. We can enhance citizens' and stakeholders' eco-friendly mindset, trigger the recovery process for abandoned/underused natural spaces, and increase collective ownership of public places.

[Online workshops](#) have also been developed to transfer scientific research results from higher education institutions and practitioners to landowners by implementing the concept of integrated phytoremediation in urban settings, participatory practices, and wellbeing goals for the city's inhabitants.

The first workshop on "[Ecologic Transformation of the pilot sites](#)" with the Baia Mare community took place in November 2020. It was held in Romanian. The overall results of the previous online survey were also briefly presented, as this first workshop's primary purpose was to increase people engagement and introduce the co-creation processes ahead.

A series of **collaborative exercises** led to valuable discussions and feedbacks on current community problems and needs related to pilot sites and neighborhoods. The participants provided creative and transformative inputs, showing the citizens' excitement and openness regarding the five pilot sites' future transformation.



Fig. 6: "[Ecologic Transformation of the pilot sites](#)" workshop (19.11.2020 online)

More training courses, seminars, and online interactive modules are currently under development to provide the latest knowledge on phytoremediation, efficiency, effectiveness, and integrated application of input or following sustainable urban development principles.

Creating new local value chains

The [SPIRE](#) project addresses urban economic issues that are not usually considered by conventional policies from a systemic approach which, indeed, is more pertinent now than ever in the socio-economic context of COVID-19. It integrates urban elements that are often assessed as sectoral matters in an **innovative circular logic**, namely 1) new construction paradigms based on bio-mass materials, 2) alternatives to fossil fuels, and 3) new "green" business models and jobs.

As a central piece of this strategy, it brings to the table [iLEU](#) (Immaterial Local Environmental Utility), a local digital token system. Despite its name - iLEU is the actual currency in Romania - it is not a local currency but a reward system for environmentally and socially friendly actions and technologies based on blockchain.

iLEU **rewards civic and environmental behavior**, community involvement, and social and ecological (green/blue) entrepreneurship. Through its use, SPIRE stimulates awareness, knowledge, and capacities related to ecological and social resilience and sustainability. It actively engages and involves the citizenry and local stakeholders in co-creation and embedding of a shared system of values to shift the overall behavior, attitude, and relationships between actors towards an eco-friendly culture, widespread collective ownership of SPIRE's social goals, and activities.

Citizens, businesses, NGOs, and the Administration form a [quadruple helix](#) development ecosystem designed to innovate, create new products and services, and further support the civic-social economic-governance development. The ambitions of iLEU are:

1. "Translate" Nature and environmental actions to costs and material benefits;
2. Support green retrofitting through [Policies, Programmes and Initiatives \(PPI\)](#);
3. Shift the perception around green solutions to be perceived often as pricier without a clear-cut benefit on the individual investor side;
4. Manage resources more efficiently, changing the modal split in a city using incentives;
5. Combine green and social actions beyond the individual level, moving towards a community "green" approach.

This innovative value stream ensures green action and awareness, strengthens the local business ecosystem and build a more cooperative and resilient local economy.



Fig. 7: iLEU icon. Source: SPIRE ILEU whitepaper.

SPIRE is advancing in all committed areas while also working on next steps. The main challenges currently open are:

- testing the possibilities of the biomass-derived from nature-based solutions and phytoremediation processes to generate new materials and biofuels.
- reaching the level of participation needed in these times of pandemic and social distancing.
- operating in the HUB and maker spaces, through tailored training and participatory workshops, to transform mindsets and behaviors with the help of the iLEU – under approval by City Council.
- adapting and even creating new urban standards and public procurement procedures to fully develop, enhance, and upscale **SPIRE** goals.

Bibliography and References

1. Cărciumaru M., (1980). Mediul geografic în pleistocenul superior și culturile paleolitice în România. Available at: https://www.researchgate.net/publication/272567579_Mediul_geografic_in_Pleistocenul_superior_si_Culturile_paleolitice_din_Romania_The_Geographic_Environment_in_the_Upper_Pleistocene_and_the_Palaeolithic_Cultures_in_Romania
2. Coman et al., (2010). Heavy Metal Soil Pollution - Specific issues for Baia Mare area, Available at: <http://journals.usamvcluj.ro/index.php/promediu/article/view/4833>
3. Ecologic transformation of the pilot sites workshop (2020). Available at: <https://www.youtube.com/watch?>

[v=EUy62tC7HYc](#)

4.EU (2016) Using the quadruple helix approach to accelerate the transfer of research and innovation results to regional growth. Available at: <https://op.europa.eu/es/publication-detail/-/publication/6e54c161-36a9-11e6-a825-01aa75ed71a1>

5.Jabeen et al. (2009) Phytoremediation of Heavy Metals: Physiological and Molecular Mechanisms. Available at: https://www.researchgate.net/publication/225477678_Phytoremediation_of_Heavy_Metals_Physiological_and_Molecular_Mechanisms

6.Leopa, S. (2020). Standards and Key Performance Indicators for Smart Post-Industrial Regenerative Ecosystems. SPIRE - Smart Post-Industrial Regenerative Ecosystem, Technical Report D4.3.2, DOI: 10.13140/RG.2.2.33583.56481(D.4.3.2, Standards and Key Performance Indicators for Smart Post-Industrial Regenerative Ecosystems)

7.Verga P. L., Onesciuc N., Mihaiescu T., Plesa A., 2020 State of play in Baia Mare. Desk analysis, Research repository & Awareness appraisal. Bioflux Publishing House, Cluj-Napoca. Online edition, ISBN 978-606-8887-75-3. (D.4.3.3., State of play in Baia Mare - Desk analysis, Research repository & Awareness appraisal)

8.Verga P. L. (ed.), Onesciuc N., Mihaiescu T., Plesa A., Vajda B., Sebestyen T., Pop S., Ghise C. R., Ghise C. I., Pop A. M., 2020 SPIRE Baia Mare: State of the Art / Innovation Landscape Report. Bioflux Publishing House, Cluj-Napoca. Online edition, ISBN 978-606-8887-73-9. (D.4.3.1, State of the Art Innovation Landscape Report)

9.SPIRE project (2020). Available at: <http://spire.city>

10.UN Habitat (2016) New Urban Agenda. Available at: <https://uploads.habitat3.org/hb3/NUA-English.pdf>

11.UN Habitat / City Resilience Global Programme (2019) Social Resilience Guide. Available at: <https://urbanresiliencehub.org/wp-content/uploads/2020/03/Social-Resilience-Guide-Pages-Small.pdf>

Sustainable use of land and nature based solutions

See on UIA website

