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Artículos

Urban Green Spaces, Health, and Wellbeing: Social Value Estimation of a Community Garden in Slovakia

Espacios verdes urbanos, salud y bienestar: estimación del valor social de un huerto comunitario en Eslovaquia [*]

Espaços verdes urbanos, saúde e bem-estar: uma estimativa do valor social de uma horta comunitária em Eslováquia

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Abstract:

This study estimates the social value of community garden solutions co-designed and co-deployed in Nitra, Slovakia, under the IN-HABIT project, focusing on health and well-being. An extended social return on investment (SROI) framework was tested with community garden users, volunteers, and project implementers. A stakeholder-informed process developed a theory of change, identifying key outcomes, including improved health, psychological well-being, and environmental awareness. Two valuation approaches are compared: one involving direct stakeholder input through contingent valuation and Scholten's Value Game, yielding an SROI of 2.15 Euros per Euro invested. The second approach, based on financial proxies, resulted in a higher ratio of 4.27 Euros, emphasizing the importance of local context in valuation. Findings suggest that investments in participatory green space can yield substantial and durable social value, particularly in enhancing community resilience, mental health, and environmental awareness. The results highlight the significant social, environmental, and community-building benefits of participatory green infrastructure, particularly in underserved urban areas.

Keywords: Community Garden, Contingent Valuation, Health and Wellbeing, Social Return on Investment, Value Game.

Resumen:

Este estudio estima el valor social de las soluciones de huertos comunitarios codiseñados y codesarrollados en Nitra, Eslovaquia, en el marco del proyecto IN-HABIT, centrándose en la salud y el bienestar. Se probó un marco ampliado de rentabilidad social de la inversión (SROI) con usuarios de huertos comunitarios, voluntarios y ejecutores de proyectos. Mediante un proceso en el que participaron las partes interesadas, se desarrolló una teoría de cambio en la que se identificaron los siguientes resultados: la mejora de la salud, el bienestar psicológico y la concienciación medioambiental. Se compararon dos enfoques de valoración: el primero implicó la aportación directa de las partes interesadas a través de la valoración contingente y el Juego del Valor de Scholten, que arrojó un SROI de 2,15 € por euro invertido. El segundo enfoque, basado en aproximaciones financieras, arrojó una ratio superior de 4,27 €, lo que subraya la importancia del contexto local en la valoración. Los resultados sugieren que las inversiones en espacios participativos verdes pueden generar un valor social sustancial y duradero, sobre todo en la mejora de la resiliencia de la comunidad, la salud mental y la concienciación medioambiental. Los resultados ponen de relieve los importantes beneficios sociales, medioambientales y comunitarios de la infraestructura verde participativa, especialmente en zonas urbanas desatendidas.

Palabras clave: huerto comunitario, juego de valores, rentabilidad social de la inversión, salud y bienestar, valoración contingente.

Resumo:

Este estudo estima o valor social das soluções de hortas comunitárias co-desenhadas e co-implantadas em Nitra, na Eslováquia, no âmbito do projeto IN-HABIT, centrando-se na saúde e no bem-estar. Um quadro alargado de retorno social sobre o investimento (SROI) foi testado com utilizadores de hortas comunitárias, voluntários e implementadores de projectos. Um processo informado pelas partes interessadas desenvolveu uma teoria da mudança, identificando os principais resultados, incluindo a melhoria da

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saúde, o bem-estar psicológico e a consciencialização ambiental. São comparadas duas abordagens de avaliação: uma que envolve o contributo direto das partes interessadas através de uma avaliação contingente e do Jogo de Valor de Scholten, produzindo um SROI de 2.15 Euros por Euro investido. A segunda abordagem, baseada em indicadores financeiros, resultou num rácio mais elevado de 4.27 Euros, sublinhando a importância do contexto local na avaliação. Os resultados sugerem que os investimentos em espaços verdes participativos podem produzir um valor social substancial e duradouro, particularmente no aumento da resiliência da comunidade, da saúde mental e da consciência ambiental. Os resultados destacam os benefícios sociais, ambientais e de construção de comunidade significativos da infraestrutura verde participativa, particularmente em áreas urbanas carentes.

Palavras-chave: valiação contingente, horta comunitária, jogo do valor, retorno social do investimento, saúde e bem-estar.

Introduction

Modern urbanisation is characterised by rapid population growth, increasing spatial density, and environmental pressures that pose challenges to social cohesion, public health, and ecological sustainability (Piracha & Chaudhary, 2022; Rathnayke & Amofah, 2023). Nitra, Slovakia's fifth largest city, reflects urbanisation challenges typical of post-socialist cities, shaped by industrial growth, suburbanisation, and socio-economic change (Eliaš et al., 2021). The legacy of socialist-era planning and recent industrial expansion has contributed to urban sprawl, traffic, and declining green spaces (Hardi et al., 2020). Urbanisation and suburbanisation also had serious social impacts, straining housing, services, and social integration of new urban dwellers (Falťan, 2019). The loss of permeable surfaces and insufficient green infrastructure limits access to recreational and social spaces, further reducing opportunities for integration and community-building, particularly for vulnerable groups (Hardi et al., 2020).

Funded under the Horizon 2020 mechanism, the IN-HABIT project addresses some of these challenges by integrating cultural, digital, natural and social innovations into the co-design, co-development and co-management of urban public spaces. In Nitra, the pilot area encompasses public and semi-public green spaces, including a community garden, KOZA. Established in 2010 as a part of the cultural and community centre Hidepark, the initial intention was to create a space that would counterbalance the challenges the city experiences in relation to the availability and quality of green spaces. IN-HABIT interventions in the community garden were co-designed and co-deployed, primarily involving the Slovak University of Agriculture researchers, Hidepark centre employees and volunteers, CUKETA NGO members and individual gardeners, with other experts and practitioners. Landscaping was conducted, the garden was expanded with new functional and recreational elements, while community events and educational workshops were co-organised.

Implementing these solutions intended to bring various social and environmental benefits, primarily focused on inclusive health and wellbeing, and impact multiple stakeholders. Evaluating these effects is crucial to fully capture the broader societal impact of such urban interventions and can guide the decision-making process on future interventions. However, despite the recognised benefits of urban green spaces, quantifying the social impact remains a methodological challenge. As these impacts do not have a financial character, they require a specific approach for their assessment. Given the co-design, co-development, and co-management dimensions of these solutions, including individual stakeholders in the impact evaluation process and capturing their benefits and costs, is integral. However, developing and applying a comprehensive framework involving stakeholders is challenging (Papastergiou et al., 2023).

This study focuses on assessing the social value generated by the IN-HABIT project's interventions in a community garden in Nitra, utilising the social return on investment (SROI) framework. The SROI framework captures the broader impacts of interventions by linking inputs to outcomes through a theory of change. Adapted from the traditional return on investment (ROI), SROI quantifies effectiveness through a ratio of monetised social outcomes to investments (Banke-Thomas et al., 2015; Edwards & Lawrence, 2021; Nielsen et al., 2021). The analysis uses two valuation strategies: direct stakeholder valuation and a proxy-based

approach. In the first approach, we apply contingent valuation, reflecting a significant branch of urban green spaces valuation methods (Papastergiou et al., 2023). The second approach reflects efforts to standardise and make social value comparable in SROI analyses. Social value databases such as the HACT Social Value Bank or the Australian Social Value Bank provide methodologically consistent social values for a wide range of outcomes and thus enable time and human resources to be saved in estimating social value (Frijters et al., 2024; Papastergiou et al., 2023). As a social value database is not available in the Slovakian context, we use the Danish OSVB (202x) based on the WELLBY indicator (Frijters et al., 2024), representing a spatially close and accessible option.

The article is organized as follows: in the theoretical background we discuss the benefits of community gardens, the use of non-market valuation methods in this context and the social return on investment (SROI) framework, in the methodology section we describe how the SROI framework was applied to estimate the social return on investment of a community garden in Nitra, in the next section the results

Theoretical Background

Urban green spaces, such as parks and community gardens, are vital to city life and contribute to improved quality of life (Corkery, 2019). They support biodiversity, lower urban temperatures, enhance air quality, and promote well-being. As design influences mental health, planners must consider residents' socio-psychological needs (Enssle & Kabisch, 2020; Solovey & Kovaleva, 2017). Poor mental health, closely linked to poverty and exclusion, affects individuals, families, and society (Victor & Yang, 2012). Loneliness, a significant public health issue, can worsen mental health outcomes (Meltzer et al., 2013; Victor & Yang, 2012). Community gardens are green spaces with numerous health benefits (Austin, 2014, p. 19). Through shared maintenance, they foster social interaction, a sense of belonging, and civic participation (Austin, 2014, p. 22). Motivations for community gardening include improving neighbourhood aesthetics and safety (Glover, 2003), love of nature, environmental ethics (Irvine et al., 1999), building relationships, and physical activity (Armstrong, 2000). They enhance access to healthy food, promote better eating habits, and help prevent obesity through increased physical activity (Al-Delaimy & Webb, 2017). Interest in community gardens, a form of urban agriculture, is growing (Laycock Pedersen et al., 2023).

Public and environmental goods provided by urban green spaces often lack market prices, yet their impacts must still be assessed in planning and policy evaluations. Over the past decades, various non-market valuation methods have been developed to assess their value. Among these, contingent valuation has emerged as the dominant approach due to its ability to estimate the total economic value, capturing both use and non-use values under hypothetical future scenarios. Its popularity stems from its ease of application, relatively low cost, and flexibility across various types of ecosystems and environmental services (Dinda & Ghosh, 2021; Halkos et al., 2022; Papastergiou et al., 2023). In contrast, the choice experiment method has gained traction in recent years as a more sophisticated stated preference approach by evaluating preferences by enabling respondents to make trade-offs between different features of non-market goods, thus mimicking real-world decision-making (Van Oijstaeijen et al., 2022). Other commonly used methods include the travel cost method, which infers value based on expenditures to access urban green spaces, and benefit transfer, which adapts values from existing studies to new contexts (Papastergiou et al., 2023).

A key challenge in impact assessment is creating a decision-making framework that reflects preferences of the citizens to guide where and how green space development should occur. There is a need to take a societal perspective in the assessment, consider different population subgroups, and use locally relevant data. This can shift the focus to the social return on investment (SROI) framework, utilising a holistic approach (Edwards & Lawrence, 2021). SROI was first developed in 1996 by the Roberts Enterprise Development Fund (Corvo et al., 2022). The goal was to go beyond traditional financial returns and measure the actual impact of

interventions on people's lives. This led to the creation of a framework that measures the social, economic, and environmental impacts of investments, commonly referred to as the triple bottom line (Norman & MacDonald, 2004). At its core, SROI calculates a ratio of benefits to investments, translating non-monetary social outcomes into monetary terms (Corvo et al., 2022). Edwards & Lawrence (2021) recommend using the SROI framework when interventions impact the local environment and specific stakeholder groups. As a bottom-up, locally focused method, SROI emphasises individual participants and defines impacts through direct stakeholder engagement. However, the process is stakeholder-involved rather than stakeholder-led (Banke-Thomas et al., 2015; Edwards & Lawrence, 2021; Kadel et al., 2022).

The SROI framework is guided by eight core principles (Social Value UK, 2024). These include: involving all stakeholders affected by an intervention, considering both intended and unintended outcomes, recognising stakeholder values, focusing on material outcomes, avoiding over-claiming, ensuring transparency, validating outcomes, and applying accurate and timely valuation and reporting. These principles inform the six-step SROI process (Nicholls et al, 2012). Step one identifies the objectives and stakeholders of the intervention. Step two maps the theory of change, outlining inputs, outputs, and outcomes. Step three selects indicators to measure results. Step four assesses socio-economic impacts using valuation methods. Step five monetizes benefits using attribution, deadweight, and drop-off. Step six calculates the SROI ratio, followed by a sensitivity analysis and communication of results to stakeholders.

Although most analyses are not peer-reviewed, the SROI framework has been widely applied in areas such as physical and maternal health, mental health (including arts, nature-based, and horticultural activities), public spaces, community health, cultural activities, digital inclusion, and other community-based initiatives (Alomoto et al., 2024; Banke-Thomas et al., 2015; Hartfiel et al., 2023; Hunter et al., 2022; Kadel et al., 2022; Robinson, 2020; Vasiliu et al., 2024). However, limitations include poor comparability of SROI ratios, limited stakeholder involvement, lack of standardised models, weak impact characterisation, overlooked opportunity costs, and challenges in applying robust valuation methods and counterfactuals like deadweight or attribution (Banke-Thomas et al., 2015; Edwards & Lawrence, 2021; Lettieri et al., 2021, p. 263; Kadel et al., 2022;).

The valuation of social benefits in SROI case studies often relies on financial proxies derived from secondary sources, including social value banks such as the Open Social Value Bank, UK Social Value Bank, Australian Social Value Bank, and Simetrica-Jacobs Social Value Bank. However, access to these databases is often paid, and their values are context-dependent, which may limit their applicability to specific stakeholder groups. Another common approach is the use of the contingent valuation method, which assesses willingness to pay for social or environmental goods (Boardman et al., 2018, p. 433; Ferreira & Marques, 2015; Szott & Motamed, 2023, p. 17). In addition, Scholten's Value Game is often used as an interactive, low-cost method to estimate the monetary value of social benefits based on stakeholder perceptions. Through focus groups or interviews, participants identify key benefits, compare them to market goods, and rank them on a reference scale, enhancing understanding of stakeholder values and supporting intervention design (Scholten, 2019, p. 6).

The aim of the paper is to estimate the social value of the community garden in Nitra and the solutions deployed under the IN-HABIT project to promote several dimensions of health and well-being. The applied approach represents the testing of a replicable social return on investment framework. The SROI framework is extended by estimating benefits for the diverse actors involved in the co-creation, co-design, and co-management processes, and considering the opportunity cost of time. By performing two valuation strategies, two distinct approaches to estimating social value are tested and compared.

Methodology

In this study, we estimate the social value of the community garden and related implemented solutions using the Social Return on Investment (SROI) framework, seeking to answer the following research questions:

- What are the key social outcomes the community garden generates, particularly regarding health and well-being?
- What is the community garden's social value and social return on investment?
- How sensitive are the results to the choice of valuation strategy?

To estimate the social value, the standardised six-step SROI methodology (Figure 1) was applied: (1) *Establishing scope and identifying stakeholders* – including gardeners, volunteers, CUKETA NGO, and the project team, covering 2022–2024 (with impacts from 2023); (2) *Mapping outcomes* – identifying inputs, outputs, and outcomes using financial data and stakeholder input, and developing a theory of change; (3) *Evidencing outcomes and giving them a value* – using contingent valuation and Scholten's Value Game, alongside values from the Danish Open Social Value Bank, weighted by survey data; (4) *Establishing impact* – adjusting for deadweight, attribution, and drop-off based on interviews, with future value discounted; (5) *Calculating the SROI* – estimating return per euro invested, including sensitivity analysis with Monte Carlo simulations; and (6) *Reporting, using and embedding* – presenting results and limitations.

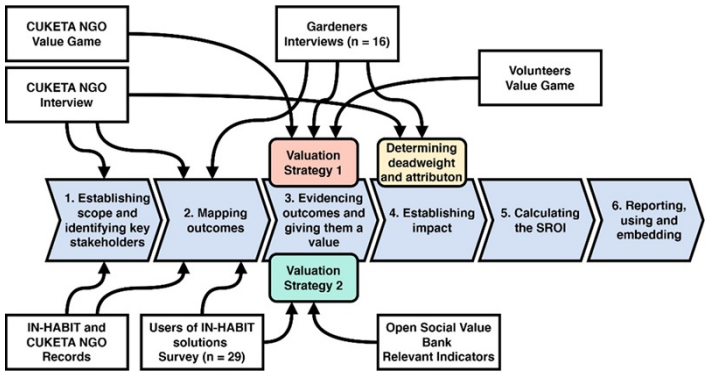

FIGURE 1.
The SROI process and data sources used
Source: Own elaboration.

The case study area is in Nitra, Slovakia, on the outskirts of the city's urban neighbourhoods. Since the beginning of the IN-HABIT project, the implementers have regularly met with gardeners and volunteers to plan the redevelopment and expansion of the garden. Hard (physical interventions) and soft (activities and events) were co-designed during 2 workshops with community members, with the involvement of experts in design, landscape architecture, dendrology and permaculture. 2 additional practical co-design workshops were organised with 3 women experts from Slovak School of Permaculture to co-validate the solutions. These were followed by 18 additional workshops, with educational elements and physical implementation of the proposed solutions. A gate to the garden was constructed, a chicken sanctuary was built, garden plots were demarcated, edible, honey-bearing and medicinal herbs were planted along the walkways, and a shelf for surplus sharing was built. A new garden workshop was installed, and an old garden pergola for hosting community events and lectures was rebuilt. 3 new garden sections were created, one for gardening, one for education and one for relaxation purposes. A new water feature was introduced – a pond built showcasing various aquatic plants and water garden ecosystems. The community garden expanded from the original 411m^2 by a total of 575m^2. In the co-deployment of these solutions, waste materials were mostly used. The inclusion of demonstration plots and an educational and recreational area aimed to showcase sustainable

gardening practices, provide hands-on learning opportunities, and foster community engagement in urban agriculture.

Multiple secondary and primary data sources were input into the analysis. The use of each primary and secondary source at each stage of the analysis is shown in figure 1. Data on financial inputs, implemented activities and outputs were obtained from the records of the IN-HABIT project team and CUKETA NGO (a civic association co-managing the garden with several other groups). Within the financial inputs, all inputs of the IN-HABIT project were included, and other inputs spent by identified stakeholders. In addition to financial inputs, we also accounted for the opportunity cost of time. By convention, the opportunity cost of beneficiaries' time was not considered (Nicholls et al, 2012, p. 32).

Reflecting the SROI framework's emphasis on stakeholder engagement in the evaluation process, we performed an in-depth structured interview with a representative of CUKETA NGO, structured interviews with gardeners (n=16, 25.4 % of all gardeners), and a more broadly-based questionnaire survey for users of the IN-HABIT project solutions (n=29). Their function was mainly to identify key outcomes and societal benefits of the community garden, as well as to estimate social value. The interview with the representative of CUKETA NGO was conducted in March 2024 and helped clarify the space's functioning, define the stakeholders, and identify the benefits from the organization's perspective. Personal structured interviews with gardeners were conducted between March and April 2024. The interviews focused on identifying and describing the perceived benefits of the community garden and evaluating these benefits. Complementary questions were asked to obtain information to estimate attribution and deadweight in the impact calculation phase, as well as about the characteristics of the interviewees. The responses of the gardeners helped to clarify how the different activities implemented led to the identified results. A more quantitative approach was applied using responses to a questionnaire survey for users of IN-HABIT solutions conducted between May and July 2024. On a scale of 0 to 5, respondents marked the extent to which the activities and workshops contributed to different elements of well-being and life satisfaction, quality of leisure time and healthy lifestyle, and social and spatial well-being. Based on responses from individuals who stated that they had participated in activities in the community garden an average score was created for each element. These sources were combined to clarify social value creation in the context of the implemented activities.

Two valuation strategies were utilised and tested to quantify the social benefits. The first approach used primary stated preference methods in the form of contingent valuation willingness to pay scenario (integrated in gardener interviews) and Scholten's Value game (Scholten, 2019) in the case of CUKETA NGO and volunteers. The presence of a payment mechanism for community members and the possibility of establishing a hypothetical scenario with a low cognitive burden formed suitable conditions for the use of contingent valuation. During the interview, gardeners were presented with a hypothetical scenario involving hypothetical payment for a field rental at a community garden described to reflect the KOZA community garden and the activities carried out during the 2023 season as closely as possible. The WTP question was formulated as an open-ended question. The interview also included questions specifying the counterfactual (deadweight and attribution). In the case of CUKETA NGO, the value game was realized during the interview. In the case of volunteers, a focus group was carried out with the participation of three individuals. Firstly, the participants had to define a set of market goods to which they attributed value and with which they would like to be endowed. They then had to form a scale out of these goods based on their perceived value, highest to lowest. Then participants were asked to place the annual benefits of the community garden on this scale. Social value was estimated as the mean value of the market goods between which the benefits of the community garden were located on the scale.

To save analytical capacity in the future while leveraging standardised data, social values obtained from a social value bank were tested in the second valuation strategy. The Danish Open Social Value Bank (OSVB) (2023) was selected as the relatively closest since a social bank created for the Slovak or even Central European context is not available. OSVB contains a database of indicators and associated social values.

From the indicators contained in the OSVB, the indicator best matching one of the key community garden benefits identified in the 'theory of change' framework was selected for each stakeholder. Given that the defined OSVB proxy indicators imply a change in the quality of health and wellbeing, it was necessary to appropriately 'weigh' the number of participating gardeners and volunteers to realistically reflect the fact that such a change occurred in only a proportion of them. In the case of gardeners, we used the questionnaire results for users of IN-HABIT solutions. The questionnaire responses allowed us to estimate the number of cases where a community member experienced given outcomes.

Results

Stakeholders and Inputs

Six stakeholder groups were identified: garden users, volunteers, CUKETA NGO, HIDEPARK NGO, lecturers, and the Slovak University of Agriculture (SUA). Garden users, the primary beneficiaries, increased from 40 to 63 by 2023–2024, forming a broader community of about 110 people. They also attended workshops in the garden. Volunteers (8–26 participants annually) supported the site's upkeep and activities, mainly through "KOZA Brigades." CUKETA NGO, composed of five members, led the organization of workshops and garden operations. HIDEPARK NGO co-organised events, supplied materials, and coordinated volunteers. Lecturers provided expertise for workshops on sustainable agriculture. SUA co-organized activities and contributed resources, infrastructure, and equipment (Table 1).

TABLE 1.
Stakeholders and inputs

Stakeholder		**Input: What did they invest?**	
Name	**Size**	**Description**	**Costs**
Community garden users	63 gardeners / 110 community members	Field rental, time, ideas	Financial costs: 5 €/month (during the season)
Volunteers	26 individuals	Time	Time opportunity costs: 1211.52 €
CUKETA NGO	1 organisation	Time, knowledge, provision of materials and equipment	Financial costs: 2061 € Time opportunity costs: 8894.52 €
HIDEPARK NGO	1 organisation	Time, provision of materials and equipment, lease of land	Financial costs: 629 €
Workshop lecturers	3 lecturers	Time, ideas, knowledge	-
SUA IN-HABIT Project team	4 researchers	Time, ideas, knowledge, providing materials, equipment, infrastructure	Financial costs: 5995.25 €

Source: Own elaboration based on CUKETA NGO interview, CUKETA NGO and SUA IN-HABIT Project team records.

Regarding the inputs, CUKETA NGO primarily invested time, contributing ideas, solutions, and support to community members, along with financial resources for renting the garden plot, tools, and operational costs. Gardeners paid €5/month (March–November) to rent plots and contributed time for maintenance, knowledge sharing, and participating in activities. Volunteers mainly invested their time. HIDEPARK NGO provided funds for workshop materials and lecturer honoraria and organised events. Workshop lecturers contributed time and expertise. The SUA project team covered material costs and funded an office container repurposed as a garden workshop. A summary of the financial inputs is shown in table 2.

TABLE 2.
Summary of financial inputs

Financial input	**Value**
Total IN-HABIT costs	6624.25 €
Other costs	2061.00 €
Total	8685.25 €

Source: CUKETA NGO and SUA IN-HABIT Project team records.

Given the significant time inputs by stakeholders, opportunity costs of time were included for CUKETA NGO members and volunteers. Due to their hypothetical nature, these were calculated at half the hourly wage of equivalent job roles. Based on interviews, the CUKETA NGO leader spent 55 hours/month in-season and 8 hours/month off-season, while other members averaged 14 hours/month in-season. Using the project manager wage (€11.16/hour), the total opportunity cost was €8,894.52. For volunteers, a gardener's wage (€6.31/hour) was used, totalling €1,211.52. Lecturers were excluded as they were financially compensated.

Theory of Change

To quantify the social benefits, it was necessary to identify the outcomes for each stakeholder. In a stakeholder-informed process, a theory of change comprising affected groups, realised activities, and a chain of outcomes was produced. This process clarified the creation of social value in the context of the implemented activities. The resulting theory of change related to health and well-being is shown in figure 2. The outputs and outcomes are summarised in table 3.

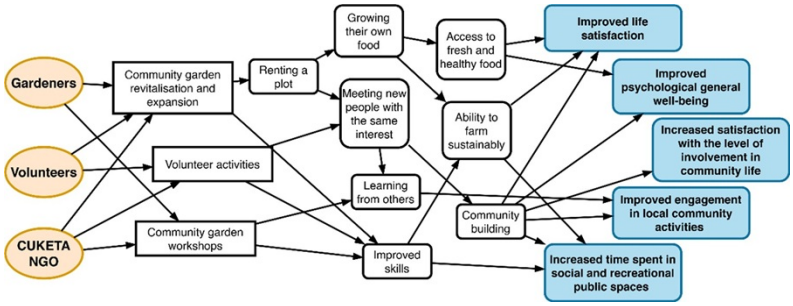

FIGURE 2.
Community Garden solutions theory of change related to health and well-being
Source: Own elaboration.

TABLE 3.
Outputs and outcomes

Stakeholder	Outputs	Outcomes
Community garden users	Growing crops in a rented field, participating in workshops, participating in co-design activities. 11 KOZA workshops in the community garden focused on permaculture and revitalisation of objects and space in the community garden.	Improved life satisfaction, Improved psychological general well-being.
		Increased satisfaction with the level of involvement in community life.
		Improved engagement in local community activities, Increased time spent in social and recreational public spaces.
		Growing their food, access to fresh and healthy food.
		Learning and skill acquisition.
		Participation in community garden space co-design.
		Fostering local biodiversity and reducing the carbon footprint associated with food production and transport.
Volunteers	Assisting with revitalising a community garden, maintaining the garden, assisting with events. 10 KOZA brigades focused on the revitalisation and maintenance of the community garden.	Sense of belonging, building relationships among community members, improved physical and mental health, acquiring new skills.
Cuketa NGO	Ensuring the functioning of the community garden and its activities, helping gardeners, organising workshops, managing volunteers.	Fostering access to fresh and healthy food, building awareness in sustainable agriculture, community building, fostering biodiversity in the city.
HIDEPARK NGO	help with organising workshops, managing volunteers.	Not included in the analysis.
Workshop lecturers	Lecturing at 11 workshops.	Not included in the analysis.
SUA IN-HABIT Project team	Procurement of solutions, help with organising workshops.	Not included in the analysis.

Source: Own elaboration.

Gardeners, CUKETA NGO and volunteers agreed that this space promotes the health, well-being and environmental awareness of the city's residents. Community members stressed that working in the garden provides physical activity, emotional balance and an escape from everyday stress. Contact with nature and aesthetic sensations are perceived as therapeutic effects. One interviewee admitted to going through regular cycles of anxiety and burnout. Spending time in the garden helps him because of the contact with nature and the overall aesthetic sensations. Another interviewee admitted that he has been diagnosed with a serious illness, and having social contact in conjunction with contact with nature and performing light physical work is imperative to his mental well-being, as it is a source of coping with his illness. Gardeners view the site as a space to bring together people with similar values, where socialization extends beyond individual gardening at home. Shared workshops and activities lead to the acquisition of knowledge and the creation of relationships that promote sustainability. The CUKETA NGO representative highlighted the fight against anonymity in the city and the integration of the community, with volunteers seeing their work as an inspiration to others, leading to wider involvement of residents in social activities. Volunteers perceive the work of maintaining the garden as a source of a sense of purpose and improving teamwork. All groups recognize the environmental benefits of the garden. Plot users gain knowledge about permaculture and sustainable agriculture, which they put into practice. The NGO highlights the promotion of biodiversity and mitigation of climate impacts through greenery and growing their own food.

Social Value and Impact

The indicators, methods and sources used to estimate social value are shown in table 4. Under the first valuation approach, social value was estimated for community members, CUKETA NGO, and volunteers. In a contingent valuation willingness to pay scenario, the gardeners were asked to imagine a situation where the KOZA community garden does not exist, and they were presented with another new community garden in Nitra and explained that maintaining the site would incur costs. They were then asked to indicate the maximum amount in Euros they would be willing to pay per month to rent a field in the described community garden. The amount of willingness to pay ranged from 10 to 50 Euros. Based on the responses to the WTP question, a mean monthly willingness to pay of €22.38 was calculated. The total willingness to pay of gardeners was determined based on the number of gardeners and the number of months of the period included in the analysis (14 months total during 2023 and 2024). Interviewees stated on a Likert scale of 0 to 5, the extent to which they experienced selected community garden benefits during the 2023 season. Based on the relative weight of the average scores of these perceived benefits, it was possible to segment the resulting total willingness to pay (Figure 3). In the case of "Socialising with other community users, strengthening community cohesion" and "Learning and skills acquisition", a continuation of these benefits into the future was also considered. We hypothesised that future value would stem mainly from the social ties and trust created between community members, and also from the skills acquired in the field of sustainable agriculture. In both cases, we estimated that they will be generated over the next five years.

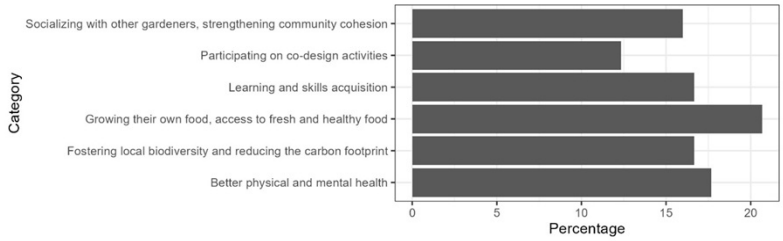

FIGURE 3.
Relative importance of community garden benefits
Source: Gardener interviews.

Utilizing Scholten's Value game method, we quantified the CUKETA NGO's and volunteers' social benefits. The CUKETA NGO representative placed the value of the community garden between "personal gardener per year" (valued at 9900 Euro per season according to the public Slovak job portal) and "natural swimming pool" (valued at 16300 Euro with installation and maintenance per year based on market research). The value for CUKETA NGO was determined as a mean value, which amounts to a total of 20377.78 Euro for the 14 months of 2023 and 2024 seasons. A similar approach was taken for volunteers. Through an interactive process, they jointly created a range of desired market goods ranked according to their value. For volunteers, the social value was valued at 42.85 Euros per person. This value was multiplied by the average number of volunteers involved in the activities each year. The resulting value was 1441.47 Euros. The evaluation showed that the benefits for volunteers are significantly lower compared to plot users or CUKETA NGO members, as their work as volunteers involves primarily maintaining the garden, not participating in or implementing activities for personal development.

TABLE 4.
Indicators and methods used in valuation strategies

	Stakeholder	Gardeners	Volunteers	CUKETA NGO
Valuation Strategy 1	Indicator	Number of gardeners in a season	Average number of volunteers involved in community garden activities	Number of seasons utilising implemented solutions
	Value	63 (2023), 63 (2024)	21.5 (2023), 12.14 (2024)	1,56 (14 months)
	Method	Contingent valuation WTP scenario	Scholten's Value game	Scholten's Value game
	Source	Gardener interviews (n = 16)	Volunteer focus group	CUKETA NGO representative interview
Valuation Strategy 2	Indicator	Weighted number of gardeners experiencing increased satisfaction with the level of involvement in community life	Average number of volunteers involved in community garden activities	-
	Value	50.726 (2023), 50.726 (2023)	21.5 (2023), 12.14 (2024)	-
	Method	Proxy indicator "Member of a social group"	Proxy indicator "Frequent volunteering (at least once per month)"	-
	Source	Open social value bank (2023)	Open social value bank (2023)	-

Source: Own elaboration

Under the second valuation approach, benefits for gardeners and volunteers were considered. The nature of the OSVB indicators made it not possible to estimate the value for the CUKETA NGO (the financial proxies in the database were limited to benefits to the beneficiaries of the interventions). Based on the results of the Theory of Change, key outcomes that best reflect the available OSVB proxy indicators for each stakeholder were considered. In the case of plot users, the benefit selected was "Increased satisfaction with the level of involvement in community life", matched by an OSVB indicator "Member of a social group", representing "the value of an adult moving from not being a member of a social group/attending events to being a member of a social group/attending events". This outcome was selected due to its strong alignment with the available proxy indicator, its direct causal link to observed impacts, and to avoid inflating the projected value. In the case of volunteers, this was "Frequent volunteering (at least once per month)", as the match with the stakeholder group is evident.

The number of gardeners who experienced "increased satisfaction with involvement in community life" was estimated using responses from the project user survey. To reflect the intensity of the effect, weights were applied—only full value was assigned to "I completely agree" responses. These results were scaled to the entire gardener group (Table 5). The weighted number was then multiplied by a financial proxy of €871.52 per year. For volunteers, the average number involved during the season was used. Since detailed participation data was unavailable and most were also active in other long-term volunteering, only one-third of the OSVB proxy (€1.542.84/year) was applied (Table 6).

TABLE 5.
Outcome indicator calculation procedure

Response (Likert scale)	**n**	**% share**	**Weight**	**Weighted number of gardeners**
0 (I completely disagree)	0	0	0.00	0
1	1	3.45	0.00	0
2	1	3.45	0.00	0
3	2	6.90	0.33	1.433793
4	7	24.14	0.67	10.18862
5 (I completely agree)	18	62.07	1.00	39.10345
Total	29	100.00	-	50.72586

Source: Own elaboration based on the IN-HABIT project solutions users survey.

TABLE 6.
Community Garden impact

Valuation strategy 1						
Deadweight: 5 %, Attribution: 14.06 %, Drop-off: 25 %, Discount rate: 3.5 %						
Stakeholder	**Generated value**	**Discounted future value**				
		Year 1	Year 2	Year 3	Year 4	Year 5
Gardeners	19739.16	3034.44	2198.87	1593.38	1154.62	836.68
Volunteers	1441.47	-	-	-	-	-
CUKETA NGO	20377.78	-	-	-	-	-
Impact	33929.53	2477.41	1795.22	1300.89	942.67	683.09
Total impact	41128.81					
Valuation strategy 2						
Deadweight: 5 %, Attribution: 14.06 %, Drop-off: 25 %, Discount rate: 3.5 %						
Stakeholder	**Generated value**	**Discounted future value**				
		Year 1	Year 2	Year 3	Year 4	Year 5
Gardeners	51576.70	12333.56	8937.36	6476.35	4693.01	3400.73
Volunteers	10894.16	-	-	-	-	-
CUKETA NGO	-	-	-	-	-	-
Impact	51003.09	10069.49	7296.73	5287.47	3831.51	2776.46
Total impact	80264.76					

Source: Own calculations.

Table 7 presents the SROI ratios under different scenarios for both valuation strategies, considering variations in financial inputs and the inclusion of opportunity costs of time. Using the direct stakeholder valuation approach, the SROI ratio is 2.15 when all financial and time costs are included, meaning every euro invested generates €2.15 in social value. When only IN-HABIT financial inputs are considered, the ratio increases to 2.42. Excluding opportunity costs significantly inflates the ratio, highlighting their importance for realistic valuation. In contrast, the second approach using OSVB financial proxies yields much higher SROI values. Even under the strictest conditions (including all financial and time costs), the ratio reaches 4.27—roughly double that of the stakeholder-based valuation.

TABLE 7.
SROI ratios

Valuation strategy	Time opportunity costs	Inputs	SROI Ratio
1	Considered	Total	2.15
1	Considered	IN-HABIT	2.42
1	Not considered	Total	4.58
1	Not considered	IN-HABIT	5.94
2	Considered	Total	4.27
2	Considered	IN-HABIT	4.80
2	Not considered	Total	9.24
2	Not considered	IN-HABIT	12.12

Source: Own elaboration.

A probabilistic sensitivity analysis was conducted to test the robustness of the SROI results (Figure 4). It included opportunity costs of time and estimated stakeholder benefits. Triangular distributions were used to model uncertainty, with observed values as the most likely, 0 % as the minimum, and 150 % as the maximum. Deadweight, attribution, and drop-off were modelled using Beta distributions to reflect their proportional nature. The analysis ran 10,000 iterations for both valuation strategies. Results show strong robustness: the SROI ratio fell below 1 in only 2.78 % of cases for the first strategy, and 1.37 % for the second.

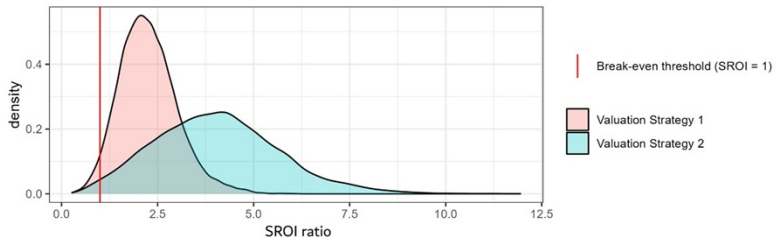

FIGURE 4.
Probabilistic sensitivity analysis
Source: Own elaboration.

The analysis of the IN-HABIT community garden project in Nitra reveals an intervention with a clear and meaningful impact on health, well-being, social cohesion, and environmental awareness. The social value generated by the project stems from the engagement of three primary stakeholder groups community garden users, volunteers, and the CUKETA NGO. The most substantial outcomes were identified among community garden users, as reflected in the theory of change. Gardeners reported significant improvements in life satisfaction, psychological well-being, and community engagement. These outcomes were linked to multiple aspects of their participation: cultivating their own food, attending permaculture and sustainability workshops, and co-designing the garden space. A strong sense of social connectedness emerged as a recurring theme, with respondents emphasising that the garden provided not just a physical space for growing food but a vital arena for building relationships, exchanging knowledge, and coping with stress and illness. The relatively

high estimated social value backs these findings. Volunteers, who assisted primarily with maintenance and event organization through the "KOZA brigades," experienced more modest but still relevant benefits. These included an enhanced sense of belonging, improved teamwork and physical well-being, and the development of practical skills. However, their role was largely supportive rather than developmental. CUKETA NGO contributed not only to the operational success of the garden but also to wider outcomes related to community-building, skill acquisition, and environmental awareness. The resulting valuation underlines the scale and depth of its impact.

In the case of valuation framework, findings highlight significant discrepancies between the two strategies and inconsistencies in projected social value across stakeholders. Estimating social value for volunteers shows the importance of considering the local context and including affected parties in the analysis. Including out-of-context financial proxies inflated the estimated social value, disregarding the actual perceived benefits to volunteers. For the second valuation strategy, the projected value is also significantly higher for gardeners. Conversely, this approach did not allow the inclusion of a value for CUKETA NGO as it does not have the position of a beneficiary of the intervention.

Conclusion

This paper assessed the social value of health and well-being interventions implemented through the IN-HABIT project in Nitra's community garden, using an extended SROI framework. A stakeholder-informed theory of change revealed key outcomes, including enhanced psychological well-being, community cohesion, environmental awareness, and knowledge sharing. Two approaches to estimating the social value of a community garden were compared. Under the first valuation strategy, engaged groups were directly involved in utilising contingent valuation and Scholten's Value game. Findings indicate that each Euro invested yields 2.15 Euros in social benefits. If only the investments of the IN-HABIT project are accounted for, social benefits increased to 2.42 Euros. The second strategy, based on financial proxies from secondary sources, led to significantly higher estimated values. Under this approach, each Euro invested is projected to yield 4.27 Euros in social benefits, rising to 4.80 Euros when considering only IN-HABIT's investments.

The analysis was limited by the scope of the periods under study. Some long-term benefits may only become apparent in the later period. Regarding data collection, the number of interviews and respondents may limit the representativeness of the findings, although the study sought broad stakeholder involvement and used many data sources. There are also limitations inherent to SROI framework and the analysis underscores the importance of refining the social value estimation process. Although the stakeholder-informed valuation strategy ensures contextual relevance, it is inherently subjective, and the value could be over- or underestimated. Furthermore, the usage of Social Value Bank data may result in inflation or misrepresentation of value if the proxy used does not fully align with the local context or intensity of the benefit, as shown in the case of the volunteers.

Further research should include the development of a comprehensive framework for assessing the social value of innovative solutions within inclusive and green public spaces in cities, involving a wide range of engaged groups, specific target groups but also project implementers and other actors involved in co-design, co-creation, and co-management given the fuzzy position of those involved. Scholten's Value Game could be further extended as a tool for estimating social value with low cognitive burden; it could be used to show differences in the perceived value generated by different stakeholders and the uninvolved public, and its ability to withstand biases in different contexts should be tested.

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Notes

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