Citation: Ozaki, Y.; Shaw, R. Citizens’ Social Participation to Implement Sustainable Development Goals (SDGs): A Literature Review. Sustainability 2022, 14, 14471. https://doi.org/10.3390/su142114471

Academic Editor: Luigi Aldieri

Received: 16 September 2022
Accepted: 1 November 2022
Published: 4 November 2022

Publisher’s Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Abstract: SDGs emphasize the importance of multi-stakeholder processes, particularly in promoting citizen-level participation. This paper aims to understand the current status of citizens’ social participation and the challenges in promoting them in order to achieve SDGs and create a resilient society. To achieve this objective, the literature review method is used. The literature was obtained from source databases related to recent literature on citizens’ participation with regard to SDGs. In the discussion and conclusion, this paper examines the possibility that one of the vital issues in promoting social participation of citizens could be information sharing. It also describes the cycle which citizens themselves become the main actors in generating information to promote citizen participation, and the information generated through this process leads further citizen participation. These results will be used as the basis for the following action research process. This paper is positioned as introductory in nature, and the importance of information sharing will be examined more closely in future studies.

Keywords: SDGs; sustainable development; citizen; participation; information; multi-stakeholder process; citizen science

1. Introduction

SDGs emphasize the importance of multi-stakeholder processes, particularly in promoting citizen-level participation. In other words, based on the lessons learned from the Millennium Development Goals, to ensure the effectiveness and legitimacy of governance, it is necessary to promote broader citizen participation in decision making. In fact, SDGs Goal.17 (Strengthen the means of implementation and revitalize the global partnership for sustainable development) includes two targets regarding this. Those are Target 17.16 “Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries” and Target 17.17 “Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries”. Additionally, importance is placed on data and monitoring for this purpose, i.e., Target 17.18 “By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts” and Target 17.19 “By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries”. Those targets require different sectors and actors working together in an integrated manner by pooling financial resources, knowledge and expertise.
Additionally, chapter 8 of Agenda 21 states that “the overall objective is to improve or restructure the decision-making process so that consideration of socio-economic and environmental issues is fully integrated and a broader range of public participation assured.” Chapter 40 of the agenda also states “in sustainable development, everyone is a user and provider of information considered in the broad sense. That includes data, information, appropriately packaged experience and knowledge. The need for information arises at all levels, from that of senior decision makers at the national and international levels to the grass-roots and individual levels.”

Thus, long before the SDGs were adopted, and even in the SDGs themselves, the need for the participation of various actors in sustainable development and the importance of information were clearly stated. However, even today, there seems to be many challenges to realize multi-stakeholder participation, especially at the citizen level.

Through a review of recent literature on the SDGs, this research examines how citizens’ participation is viewed. We will also examine how information for citizens is handled as one of the issues in promoting citizen participation and through this examination, we purpose to identify common issues in these papers regarding citizen participation and information. For this purpose, we extracted these papers from the database and analyzed them using keywords common to these papers. This paper is positioned as a basic study for a future action research project on the theme of promoting citizen participation. One of the authors of this paper is an actual official of the Tosacho Town Hall. This town is one of the SDGs Future Cities, which are the best practices for SDGs implementation by Japanese municipalities selected by the Japan government. The action research will be conducted in this town.

2. Methods

The purpose of this research is to critically analyze the state of citizen participation in recent initiatives to achieve the Sustainable Development Goals (SDGs) and the challenges it faces. Because the SDGs cover a wide range of topics, methodologies, etc., in this research, we used a systematic literature review to analyze the SDGs with the aim of identifying recent areas of exploration and emerging questions. This review was conducted using the methodological model proposed by [1] in their study on the importance of rigor in documenting the literature search process. They proposed a five-phase methodological model for this process: (1) definition of the review scope; (2) conceptualization of topic; (3) literature search; (4) literature analysis and synthesis; and (5) research agenda. This framework is described in the following sections.

2.1. Review Scope Definition

To define the scope of the literature review, an established taxonomy for literature reviews by [2] was used.

(a) Focus: The purpose of this study is to understand the status and challenges of citizen participation in recent initiatives to achieve the SDGs.

(b) Goal: The goal is to identify the central issues of citizen participation that are common to the diverse themes of the SDGs.

(c) Perspective: This study was conducted to understand how the literature with some reliability on the SDGs handles “citizen participation” and “information for citizens”. For this reason, the study does not focus on the objectives of individual articles.

(d) Coverage: A variety of themes related to the SDGs were addressed. The objective was to understand the issues that are common to them.

2.2. Conceptualization of the Topic

The following key words were used in understanding the main theme of the subject matter of this research.

SDGs (Sustainable Development Goals), Citizen, People, Participation, Engagement, Empowerment.
2.3. The Literature Search

The following steps were implemented (refer Figure 1) using [1] methodological model for the literature search: (a) choose the database source; (b) choose the type of sources (books, dissertations, articles); (c) choose keywords and search criteria; (d) evaluate the sources.

(a) Database source: Online search using Web of Science [3].
(b) Open access papers searchable on Web of Science.
(c) The following steps were used to set search criteria and extract articles.
   (i) First, a search was conducted using “(ALL = (SDGs)) OR ALL = (“Sustainable development goals”)” to identify articles in the Web of Science that focus on the SDGs. The search resulted in 17,393 papers.
   (ii) Next, a search was conducted using “(AND ((ALL = (citizen)) OR (ALL = (people)))” to identify papers related to citizens. In addition to “Citizen”, “people” was added to the search criteria to cover a wider area. The search resulted in 2513 papers.
   (iii) In this context, we decided to identify papers that include participation as an element. In addition to “participation”, by adding “engagement” and “empowerment” to the word, papers with different approaches to citizens were also included. The search was conducted using “(AND ((ALL = (participate *)) OR (ALL = (engage *)) OR (ALL = (empower *))))”, and the * search was conducted to include verbs. The search returned 713 results.
   (iv) Since the objective of this research was to identify recent trends in the subject matter of this research, the search was limited to papers from 2019 onward. The search resulted in 545 results.
   (v) Since there were still a large number of papers at this point, the papers related to “engagement” and “empowerment” were excluded from the scope of this research. As a result, there were 321 papers covered. These papers that were excluded in this research will be reviewed separately in future research for comparison with the findings of this current one.
   (vi) Finally, since we included papers for which the main body of the paper was available, papers that were not open access were excluded. As a result, 219 articles were included.
(d) Among the 219 papers listed above, we decided to select papers that were objectively reliable and highly rated. Forty papers were selected in order of the number of citations and were the subject of this review.

2.4. Validation of the Literature Review Process

In order to validate whether this literature review was properly conducted, the review process was examined using the “Important questions to consider in each step of the review” in [4].

Phase 1: design
- Is this review needed and what is the contribution of conducting this review?
  This research is necessary to identify issues to be considered in the following action research processes.
- What is the potential audience of this review?
  Those studying and practicing citizen participation in the implementation of the SDGs.
- What is the specific purpose and research question(s) this review will be addressing?
  To identify issues of citizen participation in recent research on the SDGs.
- What is an appropriate method to use regarding this review’s specific purpose?
  Select papers that deal with citizen participation from recent studies on the SDGs.
  Then, examine the common issues among these studies.
- What is the search strategy for this specific review? (Including search terms, databases, inclusion and exclusion criteria, etc.)
2.4. Validation of the Literature Review Process

In order to validate whether this literature review was properly conducted, the review process was examined using the "Important questions to consider in each step of the review" in [4].

Phase 1: design

• Is this review needed and what is the contribution of conducting this review?
  This research is necessary to identify issues to be considered in the following action research processes.

• What is the potential audience of this review?
  Those studying and practicing citizen participation in the implementation of the SDGs.

• What is the specific purpose and research question(s) this review will be addressing?
  To identify issues of citizen participation in recent research on the SDGs.

• What is an appropriate method to use regarding this review’s specific purpose?
  Select papers that deal with citizen participation from recent studies on the SDGs. Then, examine the common issues among these studies.

• What is the search strategy for this specific review? (Including search terms, databases, inclusion and exclusion criteria, etc.)

As shown in Figure 1. In addition, in reusing this algorithm in future research, we plan to enrich the research by taking into account the terms related to information sharing and other bases.

Phase 2: conduct

• Does the search plan developed in phase one work to produce an appropriate sample, or does it need adjustment?
  It is appropriate to summarize how recent papers on the SDGs address citizen participation. Since the selection was based on the number of citations, it is possible that important papers in each field were overlooked, and additional study is needed to understand the common issues.

• What is the practical plan for selecting articles?
  Understand how papers on the SDGs address citizen participation. In order to target papers that have achieved a certain level of credibility, the number of citations were used as the criteria.

• How will the search process and selection be documented?
  The search query is shown in Figure 1.

Figure 1. Steps of the literature search process.
• How will the quality of the search process and selection be assessed?
  Based on previous studies on literature review, validation is conducted by means of
  methodological models, taxonomies and guidelines that have already been evaluated.

Phase 3: analysis

• What type of information needs to be abstracted to fulfill the purpose of the specific review?
  Extract the issues common to the selected papers. Since the importance of “information” is raised in SDGs and Agenda 21, we examine information as one perspective.

• What type of information is needed to conduct the specific analysis?
  How citizen participation is valued and what challenges exist in promoting it.

• How will this process be documented and reported?
  A cross sectional analysis of all papers and analysis by research category are conducted and then presented in the Results section.

Phase 4: structing and writing the review

• Are the motivation and the need for this review clearly communicated?
  It is described as a basic study for the following action research process.

• What standards of reporting are appropriate for this specific review?
  It is structured with reference to the methodology of the previous literature review papers.

• What information needs to be included in the review?
  Information on how the literature was identified, analyzed, synthesized, and reported by the authors is included in this paper.

• Is the level of information provided enough and appropriate to allow for transparency so readers can judge the quality of the review?
  Appropriate information is provided on how public participation is addressed in recent papers on SDGs. Additionally, how “information” is addressed in those papers is appropriately considered, but other issues may require more detailed analysis in the future.

• Are the results clearly presented and explained?
  Clearly explained, including limitations in this research.

• Is the contribution of the review clearly communicated?
  It contributes to identifying what issues regarding citizen participation have been discussed in recent papers on SDGs. We also clarify that information sharing is one of the important issues in the discussion.

2.5. Literature Analysis

The 40 papers are listed in Table 1.

First, these papers were categorized based on the keywords and titles given to the papers. This enabled us to identify research topics that have been popular in recent years. In doing this, we also compared the methodologies and conclusions of each paper and analyzed the commonalities among the categories. (Refer Table 2)

Next, we compared the context in which “participation” word is used in each paper and analyzed the trends in each category. In this analysis, we paid particular attention to the handling of “information” for citizens and examined both the information provision to citizens (e.g., open data) and the understanding of information by citizens (e.g., citizen science).

Table 1. List of the papers (Category, Theme, Authors, Journals, Published year).

<table>
<thead>
<tr>
<th>Category</th>
<th>Theme</th>
<th>SDG</th>
<th>Ref. No.</th>
<th>Citations</th>
<th>Author</th>
<th>Journal</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Theme</td>
<td>SDG</td>
<td>Ref. No.</td>
<td>Citations</td>
<td>Author</td>
<td>Journal</td>
<td>Year</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------</td>
<td>-----</td>
<td>----------</td>
<td>-----------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>Future Seas</td>
<td>14</td>
<td>[18]</td>
<td>16</td>
<td>K.L. Nash et al.</td>
<td>Reviews in Fish Biology and Fisheries</td>
<td>2022</td>
</tr>
<tr>
<td></td>
<td>Digital conservation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biodiversity</td>
<td>13</td>
<td>[23]</td>
<td>22</td>
<td>C. Capitani et al.</td>
<td>Sustainability Science</td>
<td>2019</td>
</tr>
<tr>
<td>Gender</td>
<td>prioritization of the</td>
<td>5</td>
<td>[26]</td>
<td>13</td>
<td>P. Hepp et al.</td>
<td>Global Policy</td>
<td>2019</td>
</tr>
<tr>
<td></td>
<td>gender goal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Economy</td>
<td>5, 8, 10</td>
<td>[28]</td>
<td>17</td>
<td>R.B.C. Nunez et al.</td>
<td>Sustainability</td>
<td>2020</td>
</tr>
<tr>
<td>Governance</td>
<td>MAMCA</td>
<td>11</td>
<td>[29]</td>
<td>11</td>
<td>A.C.L. Almeida</td>
<td>Heliyon</td>
<td>2019</td>
</tr>
<tr>
<td></td>
<td>Agroecology</td>
<td>All</td>
<td>[30]</td>
<td>76</td>
<td>C.R. Anderson et al.</td>
<td>Sustainability</td>
<td>2019</td>
</tr>
<tr>
<td></td>
<td>Data</td>
<td>All</td>
<td>[31]</td>
<td>20</td>
<td>A. Fisher et al.</td>
<td>Journal of Human Development and Capabilities</td>
<td>2019</td>
</tr>
<tr>
<td></td>
<td>SPhR</td>
<td>3</td>
<td>[34]</td>
<td>15</td>
<td>D.M.C. Engel et al.</td>
<td>Lancet Child &amp; Adolescent Health</td>
<td>2019</td>
</tr>
<tr>
<td></td>
<td>adolescents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lancet</td>
<td>2019</td>
</tr>
<tr>
<td></td>
<td>UHC</td>
<td>3</td>
<td>[37]</td>
<td>155</td>
<td>R. Lozano et al.</td>
<td>Journal of Physical Activity &amp; Health</td>
<td>2021</td>
</tr>
<tr>
<td></td>
<td>HiAP</td>
<td>3</td>
<td>[38]</td>
<td>42</td>
<td>O. Ramirez-Rubio et al.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical Activity</td>
<td>3, 9, 11, 13, 16</td>
<td>[39]</td>
<td>29</td>
<td>D. Salvo et al.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Innovation</td>
<td>Heritage Organizations</td>
<td>11</td>
<td>[40]</td>
<td>23</td>
<td>F. Cappa et al.</td>
<td>Sustainability</td>
<td>2020</td>
</tr>
<tr>
<td></td>
<td>Small Farm</td>
<td>1, 2</td>
<td>[43]</td>
<td>50</td>
<td>S.O. Ogutu et al.</td>
<td>World Development</td>
<td>2019</td>
</tr>
</tbody>
</table>
### Table 2. Methodology and Conclusions.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Methodology</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>[5]</td>
<td>An analysis of Citizen Observatories’ project activities and outcomes mapped</td>
<td>Global datasets are growing exponentially, 68 percent of the 93 environmental SDG indicators cannot yet be monitored due to a lack of suitable data. COs emerge as promising mechanisms for closing data gaps and helping to validate monitoring data from other sources.</td>
</tr>
<tr>
<td>[6]</td>
<td>Systematic review of the metadata and work plans of the 244 SDG indicators,</td>
<td>Citizen science provides the public with the means to inform policy, which could raise trust, credibility and ultimately accountability in the SDG monitoring process. Moreover, engaging with citizens in the data collection process, and in research more generally, could create opportunities to stimulate citizen action.</td>
</tr>
<tr>
<td></td>
<td>and the identification of past and ongoing citizen science initiatives that</td>
<td></td>
</tr>
<tr>
<td></td>
<td>could directly or indirectly provide data for these indicators.</td>
<td></td>
</tr>
<tr>
<td>[7]</td>
<td>By performing a systematic review of citizen science studies on bees, assessed</td>
<td>Since sustainability can only be achieved through an intergenerational approach, establishing firm partnerships is an essential step, whereby citizen science can act as a powerful strategy for providing data and implementing SDGs.</td>
</tr>
<tr>
<td></td>
<td>how these studies could contribute towards SDG reporting and monitoring, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>also verified compliance with citizen science principles.</td>
<td></td>
</tr>
<tr>
<td>[8]</td>
<td>designed a survey to obtain direct assessments of the contribution of citizen</td>
<td>Indicate that European citizen science projects lack infrastructures and institutional support to facilitate data sharing. Recommend a focus on the promotion or creation of interfaces, for example, between projects and UN databases.</td>
</tr>
<tr>
<td></td>
<td>science to the SDGs by European project participants.</td>
<td></td>
</tr>
<tr>
<td>[9]</td>
<td>Undertake a collaborative prioritization process with experts in conservation</td>
<td>Citizen science can provide data to support decision-making and reporting against international targets. Participation can also provide societal benefits, informing and empowering people, thus supporting the United Nations’ Sustainable Development Goals.</td>
</tr>
<tr>
<td></td>
<td>and the environment to assess the potential of environmental citizen science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in East Africa, including its opportunities, benefits and barriers.</td>
<td></td>
</tr>
<tr>
<td>[10]</td>
<td>A questionnaire based on validated studies was created and used to analyze</td>
<td>Scientific literacy will presumably make it possible to develop critical thinking among pupils, and promote citizens who are freer, and have greater ownership of their destiny, which is what scientific education aims for. Pupils must learn about science in the same way that science itself works.</td>
</tr>
<tr>
<td></td>
<td>the changes in attitudes of pupils towards science and technology and their</td>
<td></td>
</tr>
<tr>
<td></td>
<td>improvement in scientific literacy in terms of scientific processes and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>scientific situations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[11]</td>
<td>Challenges and critical aspects are discussed based on the opinions of</td>
<td>The results point out to the involvement of Citizen Science activities mainly with SDG 4, 11, 13, 15; to the need for institutionalization of CS representation in the national and international SDGs processes; to the importance of CS data infrastructure for the SDGs monitoring framework; to the mutual benefits of CS and SDGs from strengthening education and competencies; to the increase in the presence of Citizen Science in companies through fair partnerships; and to the importance of Citizen Science in the policy cycles which helps the governments in fulfilling their commitments to the SDGs.</td>
</tr>
<tr>
<td></td>
<td>practitioners collected through a comprehensive online survey</td>
<td></td>
</tr>
<tr>
<td>[12]</td>
<td>Performed a systematic literature review and analysis of “public participation”</td>
<td>The results show four pathways through which current public participation in energy communities might be more explicitly aligned with citizen science projects: benefits and values, energy practices, intermediaries, and energy citizenship.</td>
</tr>
<tr>
<td></td>
<td>and “energy communities” using the Preferred Reporting Items for Systematic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Review and Meta-Analyses (PRIMSA) guidelines</td>
<td></td>
</tr>
<tr>
<td>[13]</td>
<td>Analyzed whether a didactic intervention, consisting of informing teachers</td>
<td>The educational intervention of this study showed that, by working on FW, it contributes to achieve not only SDG 4 and SDG 12, which it is directly related to but, from education, it also allows other Agenda 2030 goals to be worked on.</td>
</tr>
<tr>
<td></td>
<td>and pupils in reducing FW, could bring about changes in the level of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>knowledge and attitude towards FW and in the amount of FW generated during</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the mid-morning break and lunch at schools.</td>
<td></td>
</tr>
<tr>
<td>[14]</td>
<td>A quasi-experimental method was used to learn about the behaviors of digital</td>
<td>The results are revealing as they show an important improvement in the digital citizenship skills of students. Above all, Critical Perspective and Political Activism on the Internet are proven to play a key role.</td>
</tr>
<tr>
<td></td>
<td>citizens, and intervention was carried out by means of an SDG-focused</td>
<td></td>
</tr>
<tr>
<td></td>
<td>workshop and observation of the final level of commitment.</td>
<td></td>
</tr>
<tr>
<td>[15]</td>
<td>the case study that explore pre-service teachers’ changes in their values,</td>
<td>Students reported significant changes in their beliefs about the relevance of sustainability education, attitudes toward sustainable development, self-efficacy, locus of control and sustainable consumption practices.</td>
</tr>
<tr>
<td></td>
<td>sense of agency, consumption practices and motivation after participation in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a required EIS course.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. Cont.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Methodology</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>[16]</td>
<td>A review on how pedagogical approaches in science, technology, engineering, and mathematics (STEM) education can be deployed to teach concepts of sustainability: Seventy-seven STEM teaching projects of teachers across the country were analyzed, and interviews were conducted with 635 teachers who participated in the STEM program.</td>
<td>Inclusive STEM education could contribute to the achievement of SDG4—equitable and quality education for sustainable development and sustainable lifestyles and social equity. It should have received more attention. The implementation of inclusive STEM education requires innovation and change in pedagogical approach, curriculum development, methods of student assessment, school management structure and teacher-support initiatives.</td>
</tr>
<tr>
<td>[17]</td>
<td>Included several key performed indicators (KPIs), in order to evaluate the E.P of an area, through hybrid approach which cover among others, the waste compositional analysis, SWOT and PESTEL analysis, waste recycling and waste accumulation index, prevention activities, awareness activities etc.</td>
<td>Transitioning towards a sustainable waste strategy to be in a position to adopt CES, EGD and SDGs, involves validation methods that can be functional at all levels and moreover strong political decisions and commitment must be agree, even though success implementation of any waste strategy (i.e., prevention, recycling, reuse etc.), their results does not have direct to the citizens.</td>
</tr>
<tr>
<td>[18]</td>
<td>Brought together researchers across career stages, Indigenous Peoples and environmental managers to develop scenarios for 12 challenges facing the oceans, leveraging interdisciplinary knowledge to improve society’s capacity to purposefully shape the direction of marine social-ecological systems over the UN Decade of Ocean Science for Sustainable Development (2021–2030).</td>
<td>The complex and uncertain nature of many key challenges facing the oceans and our society can lead to inertia and paralysis among private and public actors alike. We need to develop and disseminate tangible depictions of where we are headed but also where we could head if we actively chose to steer the transformation to a more sustainable future.</td>
</tr>
<tr>
<td>[19]</td>
<td>Assesses the CES perceived by different users in five distinct urban parks. A questionnaire survey was performed in each park to investigate the activities performed and their relevance for the users, users’ motivations to develop the activities on that specific UGS, the perceived benefits regarding physical and emotional well-being and social interactions, and users’ perception about disservices.</td>
<td>Characteristics such as UGS size, the distance between UGS and users’ residence, water elements in the landscape, and available sports equipment affect the UGS multifunctional use. Although presenting additional management challenges, multifunctional UGS can provide a diversified set of CES-related activities to be both offered and enjoyed by urban dwellers, even in limited-size areas.</td>
</tr>
<tr>
<td>[20]</td>
<td>Proposed a collaborative community-led marine park concept that celebrates a city’s connection to the marine environment, enhances sustainable economic prosperity and enables communities to participate in activities that deepen understanding, value, care and enjoyment of the city seascape.</td>
<td>A CMP will serve as a vehicle for building a deeper connection between people and the marine environment through a holistic approach where social, economic and cultural values and benefits are considered alongside the ecological health of the ecosystem. Through nurturing growth in local knowledge of marine and coastal ecosystem and heritage, the CMP promote an organic growth in value, pride, enjoyment and care for the marine and coastal environment without the need for top-down exclusionary regulations.</td>
</tr>
<tr>
<td>[21]</td>
<td>Building mainly on recent studies on water governance carried out by The Organization for Economic Co-operation and Development (OECD) and specifically on urban water governance, this paper will discuss current trends and provide a set of tools for policy solutions based on OECD’s 3Ps framework: people, policies and places.</td>
<td>Cities can greatly benefit from the multi-stakeholder process to acquire information for each indicator. In fact, the self-assessment should be carried out in a participative manner in order to ensure that the process is transparent, neutral and open, as indicated by the 10-step methodology for self-assessment.</td>
</tr>
<tr>
<td>[22]</td>
<td>Combined information from those two digital sources in a multimodal inference framework to identify, map, and predict the potential for nature’s cultural contributions to people in two contrasting UNESCO biosphere reserves</td>
<td>Combined Earth observations and social media data to identify the major nature’s cultural contributions in the two reserves, to understand how they relate with distinct Earth observation predictors, and to evaluate the potential for nature’s cultural contributions in a spatially explicit way. The content analysis of social media photographs showed a dominance of different categories of nature’s cultural contributions, in agreement with the natural and cultural capital of these biosphere reserves.</td>
</tr>
<tr>
<td>[23]</td>
<td>Applied a participatory scenario development framework in two parts of the Eastern Afromontane Biodiversity Hotspot</td>
<td>Future trajectories of socio-ecological systems in tropical mountain ecosystems will largely depend on societal willingness and capacity, at different levels, to undertake the changes needed to reduce the impacts of climate and land management change. Through a participatory scenario development process, we engaged mountain communities in the Taita Hills, Kenya and Jimma, Ethiopia in envisioning the potential impacts of global climate change and local land changes and identifying and negotiating trade-offs between desirable and undesirable goals.</td>
</tr>
<tr>
<td>Ref. No.</td>
<td>Methodology</td>
<td>Conclusion</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>[24]</td>
<td>Report on a multi-season study of smallholder food producers’ experiences with Rwanda’s Crop Intensification Program (CIP) and related policies that aim to commercialize subsistence agriculture while implementing CSA.</td>
<td>For Rwanda, this means that rather than mandating agricultural intensification uniformly across space and time, it is essential to consider options for a nuanced approach that recognizes that there are various groups and areas of land use for whom the risks associated with full compliance are simply too high.</td>
</tr>
<tr>
<td>[25]</td>
<td>Case study research of twenty Australian restaurants featuring sustainability in their business concept and in their practices.</td>
<td>Restaurateurs who show a commitment to sustainability and underpin their business with a balanced “profit, people and planet” concept and approach achieve a committed following and make important contributions to efforts to secure the goals of the SDGs.</td>
</tr>
<tr>
<td>[26]</td>
<td>Assembled evidence to make the case that decisively (and politically) placing the gender equality goal (SDG5 and its 9 targets) together with 54 gender indicators across all goals as the priority focus of the 2030 agenda is the most impactful way to ensure measurable achievements are made across the agenda to deliver on all 5 pillars of the global commitment: namely People, Planet, Peace, Prosperity and Partnerships.</td>
<td>Propose that goal prioritization is necessary and argue that only one goal can deliver across and through the entire agenda: Goal 5—achieving gender equality. Without the full participation of all women and men and all people free of the historical and persistent pervasiveness at the intersections of sex and gender discrimination, none of the SDGs will deliver as planned.</td>
</tr>
<tr>
<td>[27]</td>
<td>Systematically reviewed rigorous evaluations published between 1 January 2000, and 1 November 2018 of programs that sought to decrease gender inequalities and transform restrictive gender norms to improve the health and wellbeing of 0–24-year-olds.</td>
<td>Thematic analysis of the evaluated programs revealed a potential model for accelerating achievement of the Sustainable Development Goals through programmatic approaches that improve health-related outcomes and seek to achieve gender equality and broader transformation of restrictive gender norms. Four such programmatic approaches were identified: (1) using multilevel and multistakeholder involvement; (2) implementing diversified programming; and (4) fostering social participation and empowerment.</td>
</tr>
<tr>
<td>[28]</td>
<td>An impact analysis with quasi-experimental counterfactual techniques, in which we compare one experimental group (the SE) with a control group (profit-seeking firms) using labor data from Spain for the period 2008–2017.</td>
<td>The impact analysis conducted in this paper contributes to the visibility of the SE as a key agent in the attainment of the SDGs related to decent employment and equal opportunities. It also provides rigor to the comparison of SE entities with traditional profit-seeking firms, highlighting the contribution of the distinctive principles of SE to sustainable and gender inclusive growth.</td>
</tr>
<tr>
<td>[29]</td>
<td>A conceptual framework was developed, and distinct indicators were analyzed to facilitate the implementation of SDG 11 in Brazilian municipalities. Two case studies were deployed based on the Multi-Actor Multi-Criteria Analysis (MAMCA) to guarantee stakeholder participation during the whole process.</td>
<td>This research concludes that the adopted methodology can support local decision-makers to build a more effective implementation of SDG 11 in Brazilian municipalities by mainly providing an overview of major urban issues based on a multi-stakeholder view.</td>
</tr>
<tr>
<td>[30]</td>
<td>Analyzed the enabling and disabling conditions that shape agroecology transformations and the ability of communities to self-organize.</td>
<td>Our analysis presents governance—particularly power imbalances and deficits in democracy—as the key determining factor for transformation across these domains.</td>
</tr>
<tr>
<td>[31]</td>
<td>Introduction of the “Journal of Human Development and Capabilities”. This introduction highlights the insights that emerge by using the framework of data infrastructure—means of collection and analysis, social structures amongst actors, knowledge systems.</td>
<td>The infrastructures of measurement are a result of an interdependent and correlative relationship between technical forms, processes and expertise, standards, laws and regulatory structures and political agendas. They show that the effects of data are biased in favor of those with power. Given the unequal distribution of and access to data, both globally and between public and private actors, questions about which data is used, who participates in its analysis, and through which process the analytic outputs are interpreted deserve enhanced attention.</td>
</tr>
<tr>
<td>[32]</td>
<td>Evaluated the accuracy of an artificial intelligence (AI) model using deep learning in a population-based diabetic retinopathy screening program in Zambia, a lower-middle-income country.</td>
<td>Showed that the AI model is clinically effective in detecting referable diabetic retinopathy, vision-threatening diabetic retinopathy, and diabetic macular oedema within a real-life diabetic retinopathy screening program in Zambia.</td>
</tr>
<tr>
<td>[33]</td>
<td>A Narrative Review about Healthy China 2030 plan to achieve health-related SDGs through sport and physical activity.</td>
<td>A program “Healthy Living for all” has been implemented with the theme of “three reductions and threefold health” under the health-related SDGs to achieve the target of Healthy China 2030. China is making tremendous progress towards the goal of Healthy China in multidimensional. To meet challenges and achieve health-related SDGs, China must take more coordinated steps.</td>
</tr>
<tr>
<td>Ref. No.</td>
<td>Methodology</td>
<td>Conclusion</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>[34]</td>
<td>Analyzed the relevance of the comprehensive definition of sexual and reproductive health and rights (SRHR) to adolescents and identifies adolescent-specific implications for the implementation of an essential package of SRHR interventions.</td>
<td>All SRHR interventions are relevant to adolescents, and to deliver on the ICPD Program of Action, the package of essential SRHR interventions must be made responsive to adolescents. As the health sector moves toward UHC, it must include SRHR, and it must cater to all adolescents including marginalized subgroups, such as unmarried adolescents, adolescents living with disabilities, and lesbian, gay, bisexual, transgender, intersex and other sex, and gender-diverse adolescents.</td>
</tr>
<tr>
<td>[35]</td>
<td>A pooled analysis of cross-sectional survey data that were collected through random sampling with a sample size of at least 100 individuals, were representative of a national or defined subnational population, and reported prevalence of insufficient physical activity by sex in adolescents.</td>
<td>The majority of adolescents do not meet current physical activity guidelines. Urgent scaling up of implementation of known effective policies and programs is needed to increase activity in adolescents. Investment and leadership at all levels to intervene on the multiple causes and inequities that might perpetuate the low participation in physical activity and sex differences, as well as engagement of youth themselves, will be vital to strengthen the opportunities for physical activity in all communities.</td>
</tr>
<tr>
<td>[36]</td>
<td>A scoping review to determine whether and to what extent HIA in sub-Saharan Africa addresses health equity included peer-reviewed publications and guidelines pertaining to HIA, environmental impact assessment (EIA) and social impact assessment (SIA).</td>
<td>In view of the strengths of rigorously conducted HIA, which might improve health equity, we recommend inclusion of a qualitative data collection step during profiling, in order to stratify the community into subgroups, address health differentials adequately and most importantly “to leave no one behind”, as suggested by the 2030 Agenda for Sustainable Development.</td>
</tr>
<tr>
<td>[37]</td>
<td>Assessed UHC effective coverage for 204 countries and territories from 1990 to 2019. Drawing from a measurement framework developed through WHO’s GPW13 consultation, we mapped 23 effective coverage indicators to a matrix representing health service types (e.g., promotion, prevention, and treatment) and five population-age groups spanning from reproductive and newborn to older adults (≥65 years)</td>
<td>This study provides a new measurement framework and metric on UHC effective coverage, supporting country and global stakeholders in their efforts to track improved performance over time. By striving to capture potential health gains delivered by health systems, we hope to better diagnose and address challenges that otherwise impede the ultimate objective of UHC: improving health for all people and leaving no one behind.</td>
</tr>
<tr>
<td>[38]</td>
<td>Create a comprehensive, urban health related SDGs conceptual framework, by linking already described urban health dimensions to existing SDGs, targets and indicators. Discuss, taking into account the necessary conditions and steps to conduct HiAP, the main barriers and opportunities within the SDGs framework.</td>
<td>HiAP, and applying tools such as HIA, can be used in cities worldwide, including those of less developed regions or countries, to achieve urban health related SDGs in the 2030 Agenda. Data availability, taking into account equity issues, strengthening the communication between experts and citizens, interdisciplinary and inter-agency collaboration and the involvement of all major stakeholders are crucial elements in a HiAP approach for SDG implementation.</td>
</tr>
<tr>
<td>[39]</td>
<td>Examined the contribution of physical activity promotion strategies toward achieving the SDGs through a conceptual linkage exercise, a scoping review, and an agent-based model.</td>
<td>Call for a synergistic approach to physical activity promotion and SDG achievement, involving multiple sectors beyond health around their goals and values, using physical activity promotion as a lever for a healthier planet.</td>
</tr>
<tr>
<td>[40]</td>
<td>Contend that visitor-sensing has the potential to yield higher numbers of visitors, with positive impacts in terms of increased revenues and increased literacy of the general public, thus benefiting the economic and social sustainability of cultural organizations towards the achievement of the Sustainable Development Goals outlined in Agenda 2030.</td>
<td>The concept of OIS implies the adoption of OI practices for the generation of new scientific knowledge, whose employment may have major societal impacts. While the contributions of the crowd have been considered so far mainly in for-profit contexts (e.g., crowdsourcing) and in not-for-profit environmentally concerned projects (e.g., citizen science), we argue that they can also be extremely helpful for the purposes of hybrid organizations such as cultural heritage organizations.</td>
</tr>
<tr>
<td>[41]</td>
<td>Literature review to explore concepts, theories and frameworks for initiating PPP. Best local and international practices in the implementation of PPP projects; challenges and opportunities in the implementation of PPP projects, strategies for mainstreaming the SDGs in Ghana’s energy sector and assess business action in the implementation of the SDGs in Ghana’s energy sector.</td>
<td>The research concluded that governments have to put in place a PPP policy and regulation to guide the practice of PPPs in Ghana. The policy should spell out the various governance structures, processes, institutions, roles and responsibilities, incentives, qualifications and target areas with sustainability goals embedded, which can be known as the sustainable PPP model. National targets should feature in relevant policy documents to ensure a holistic implementation of the SDGs across all levels of government sectors from MDAs to MMDAs.</td>
</tr>
</tbody>
</table>
Table 2. Cont.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Methodology</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>[42]</td>
<td>Use the exploratory spatio-temporal data analysis (ESTDA) method to reveal the characteristics of the spatio-temporal dynamics of multidimensional poverty.</td>
<td>According to GMM and IRF analyses, we determined the direction, extent, and path of the influential factors on poverty in China and identified the poverty-reducing and poverty-causing indicators. Except the proportion of non-agricultural industries, health insurance coverage rate of urban residents, and student-teacher ratio, other indicators are significantly related to poverty.</td>
</tr>
<tr>
<td>[43]</td>
<td>Evaluate the effect of commercialization on income poverty, as well as on the multidimensional poverty index that looks at deprivations in terms of education, nutrition, health, and other dimensions of living standard. Using data from 805 farm households in Kenya, estimate average treatment effects and also analyze impact heterogeneity with quantile regressions.</td>
<td>Commercialization reduces both income poverty and multidimensional poverty. The magnitude of the income gains is positively correlated with income level, meaning that market-linkage support for marginalized farms may be needed to avoid rising inequality. However, the effect in terms of reducing basic needs deprivations is stronger for the poorest households, suggesting that agricultural commercialization contributes effectively to achieving the sustainable development goals.</td>
</tr>
<tr>
<td>[44]</td>
<td>Eighty-two peer-reviewed publications were analyzed covering smart city studies in various research domains. The systematic review identifies five different themes: strategy and vision, frameworks, enablers and inhibitors, citizen participation, and benefits.</td>
<td>It identifies three key research thrusts: (1) sociotechnical approaches to smart cities, (2) integrating knowledge sharing perspectives and (3) developing organizational learning capabilities. These are emerging and interlinked elements of smart city development and present a conceptual approach for improving smart city knowledge management mechanisms. Smart cities have multidimensional components such as ICT applications, citizen engagement and governance.</td>
</tr>
</tbody>
</table>

3. Review Results

3.1. Analysis by Category

3.1.1. Citizen Science

The largest share of the categorization was for articles on Citizen Science (8 out of 40). “Although global datasets are growing exponentially, 68 percent of the 93 environmental SDG indicators cannot yet be monitored due to a lack of suitable data” [5] (p. 12). In promoting the SDGs, these papers highlight the lack of appropriate data sources to enable monitoring at the local level for many of the targets and indicators currently set as a problem and explains how the implementation of citizen science and observation of data at the citizen level can fill in the missing data and contribute to the achievement of the SDGs. Ref. [5], as well as [6–9], are relevant. Some studies have focused on the educational effects of citizen science, partnerships, and community building that result from the implementation of citizen science. Like “Curricular integration in formal teaching of citizen science can bring to the classroom aspects of scientific literacy that encourage the involvement of citizens” [10], in the field of education, aspects of citizen involvement are also emphasized. Additionally, in the field of partnerships and community buildings, “Citizen Science and the SDGs share the same values for global sustainability challenges and empowering people” [11] (p. 10), and “(1) evaluating benefits produced by energy communities, (2) identifying and potentially modifying energy practices, (3) empowering intermediaries, or (4) increasing energy citizenship” [12] (p. 17), aspects of citizen empowerment through involvement in citizen science projects are also discussed. In each, citizen science is identified as a core way of engaging at the citizen level in achieving the SDGs.

3.1.2. Health

Just as in Citizen Science, a large percentage of the categorization was for papers on “Health” (8 of 40). However, the approaches of the papers differ significantly and include a variety of topics, such as Examining the validity of frameworks and tools such as SPHR (Sexual and Reproductive Health and Rights) [34], HiAP (Health in All Policies) [38], HiA (Health impact assessment) [36], Studies of SDGs achievements for Universal Health Coverage [37] and physical activity promotion [35,39], Screening for Diabetic Retinopathy using AI Deep Learning technology [32], and Analysis of the relationship between SDG goals and the effects of sport [33]. All of them focus on the current situation and challenges
to achieve SDG Goal 3 “Ensure healthy lives and promote well-being for all at all ages” and many of them advocate further focus on the SDGs by the national government and administrative agencies, which may reflect the existence of initiatives that precede the SDGs. On the other hand, “(1) the importance of the intersectoral work and health equity as a cross-cutting issue in sustainable development endeavors; (2) policy coherence, health governance, and stakeholders’ participation as key issues; and (3) the need for high quality data”. In the study [38] (p. 16), some references to intersectoral collaboration, stakeholder participation, and the need for data exist, but not as a category-wide trend.

3.1.3. Environment and Climate Change

The environment and climate change were also the subject of 8 of the 40 papers. Many of the features used scenario development and application of frameworks. For example, in [18] (p. 1), “researchers across career stages, Indigenous Peoples and environmental managers develop scenarios for 12 challenges facing the oceans”, while the authors in [23] (p. 191) “apply a participatory scenario development framework in two parts of the Eastern Afromontane Biodiversity Hotspot”, the authors in [22] (p. 1), “combined information from those two digital sources in a multi-model inference framework to identify, map, and predict the potential for nature’s cultural contributions to people in two contrasting UNESCO biosphere reserves”, and the authors in [21] (p. 1) “discuss current trends and provide a set of tools for policy solutions based on OECD (The Organization for Economic Co-operation and Development)’s 3Ps framework”. All of these are intended for future projections and mapping. On the other hand, there are some papers that evaluate the performance of initiatives. The study in [17] (p. 1) states “in order to evaluate the E.P (environmental performance) of an area, through a hybrid approach, which covers, among others, the waste compositional analysis, SWOT (Strengths, Weaknesses, Opportunities and Threats) and PESTEL (Political, Economic, Social, Technical, Environmental, Legal) analysis, waste recycling and waste accumulation index, prevention activities, awareness activities, etc.”, while the author in [19] attempted to evaluate the CES (cultural ecosystem services) of urban green spaces, and the author in [24] attempts to evaluate the CIP (Crop Intensification Program). Additionally, it is unusual that [20] (p. 1) “proposes a collaborative community-led marine park concept.” Considering that it is difficult to predict environmental and climate change from the ordinary citizen’s point of view, there are a number of scenarios and other attempts to provide future projections.

3.1.4. Education

Of the 40 papers, 4 were on the subject of schools and education. All are included in the Sustainability journal. Although the approaches are different, they all focus on the theme of human resource training and its challenges for achieving the SDGs. The authors in Ref. [14] (p. 10) “find out how these aspects of local/global awareness, networking agency, critical perspective and political activism on the Internet are modified, by means of an education in sustainability and awareness workshop focused on the Sustainable Development Goals.” Additionally, the authors in [15] (p. 1) “explore pre-service teachers’ changes in their values, sense of agency, consumption practices and motivation after participation in a required EfS course.” On the other hand, the authors in [16] focus on STEM education, and the study in [13] is on the subject of education about Food Waste, but both conclude that beyond their educational benefits, their promotion will lead to a broader commitment to sustainability as a whole. For example, the study in [13] (p. 15) says that “The educational intervention of this study showed that, by working on FW, it contributes to achieve not only SDG 4 and SDG 12, which it is directly related to but, from education, it also allows other Agenda 2030 goals to be worked on”. In this sense, each papers address the development of human resources to participate in the SDGs through education.
3.1.5. Gender

There were 3 papers out of 40 on the subject of gender. Gender equality is positioned as SDGs Goal 4. Each paper concludes that addressing gender equality will accelerate the achievement of the SDGs, rather than examining the achievement of the SDG goals. Methodologically, the authors in [26] (p. 677), “assemble evidence to make the case that decisively (and politically) placing the gender equality goal (SDG5 and its 9 targets) together with 54 gender indicators across all goals as the priority focus of the 2030 agenda is the most impactful way to ensure measurable achievements are made across the agenda to deliver on all 5 pillars of the global commitment: namely People, Planet, Peace, Prosperity and Partnerships”. The study in [27] (p. e225) “reviewed rigorous evaluations published between 1 January 2000, and 1 November 2018 of programs that sought to decrease gender inequalities and transform restrictive gender norms to improve the health and wellbeing of 0–24-year-old”. The authors in [28] (p. 1) “compare one experimental group (the Social Economy) with a control group (profit-seeking firms) using labor data from Spain for the period 2008–2017”. While the themes of the studies differ—prioritizing SDG goals, improving health and well-being, and reducing gender disparities in the labor market—they share the conclusion that addressing gender disparities will promote the participation of more diverse actors and contribute to achieving the SDGs. For instance, the authors in [27] (p. e234) set “a potential model for accelerating the achievement of the Sustainable Development Goals” as “(1) using multisectoral action; (2) incorporating multilevel, multistakeholder involvement; (3) implementing diversified programming; and (4) fostering social participation and empowerment”.

3.1.6. Governance

In Refs. [29–31], these three papers focus on the topic of governance. Both of these papers have issues in the decision-making process. Ref. [29] (p. 9) conducted field work based on Multi-Actor Multi-Criteria Analysis in two cities in Brazil. “This research concludes that the adopted methodology can support local decision-makers to build a more effective implementation of SDG 11 in Brazilian municipalities by mainly providing an overview of major urban issues based on a multi-stakeholder view”. The study in [30] (p. 1) “analyzed the enabling and disabling conditions that shape agroecology transformations and the ability of communities to self-organize,”, then “presents governance—and particularly power imbalances and deficits in democracy—as the key determining factor for transformation across these domains.” Moreover, it “focuses on the dynamics of power and governance, arguing that a shift from top down technocratic approaches to bottom up forms of governance based on community-self organization across these domains has the most potential for enabling transformation for sustainability and social justice”. Ref. [31] is the introduction to the Journal of Human Development and Capabilities, and it summarizes the five case studies included. They focus on “the unequal distribution of and access to data, both globally and as between public and private actors”, and “questions about which data is used, who participates in its analysis, and through which process the analytic outputs are interpreted deserve enhanced attention”.

3.1.7. Poverty

There were two papers on poverty. Both measure the poverty index. The authors in [42] (p. 10) “use the exploratory spatio-temporal data analysis (ESTDA) method to reveal the characteristics of the spatio-temporal dynamics of multidimensional poverty.” Additionally, they “identified the poverty-reducing and poverty-causing indicators”. Meanwhile, the authors in [43] analyze Kenyan farmer data and “evaluate the effect of commercialization on income poverty, as well as on the multidimensional poverty index that looks at deprivations in terms of education, nutrition, health, and other dimensions of living standard.”, then concludes that “commercialization reduces both income poverty and multidimensional poverty”.
3.1.8. Other

Others are related to food [25], related to Partnership [41], related to open innovation [40] and related to smart cities [44]. Ref. [42] conducted a “Case study research of twenty Australian restaurants featuring sustainability in their business concept and in their practices.” They concluded “restaurateurs who show a commitment to sustainability make important contributions to efforts to secure the goals of the SDGs”. Ref. [41] implemented a “Literature review to explore concepts, theories and frameworks for initiating PPP (Public–Private Partnerships)”. They evaluated the “Best local and international practices in the implementation of PPP projects; challenges and opportunities in the implementation of PPP projects, strategies” to mainstreaming SDGs. The other two relate broadly to technology. Ref. [40] (p. 8) used digital technology “By focusing on crowd involvement in a context where it has not been properly included so far, i.e., cultural heritage organizations, on participants’ contributions and motivations, i.e., valuable insights and ideas provided on a voluntary basis from inside the organization’s environment, and the ensuing benefits for both the economic and social imperatives which characterize hybrid organizations, the present study advances the novel framework of visitor-sensing.” Through the literature review, the study in [44] (p. 6) “integrates knowledge management perspectives to inform future research directions and identifies three key research thrusts: (1) sociotechnical approaches to smart cities, (2) integrating knowledge sharing perspectives and (3) developing organizational learning capabilities”.

3.2. Cross-Sectional Analysis

3.2.1. Participation

First, an analysis of the context in which participation is handled in all the papers covered in this research shows that there are two main categories: those that explain the “need for citizen participation to achieve the SDGs” and those that explain the “requirements to promote participation and the effects of citizen participation”. These are not necessarily clearly separated, and many papers include elements of both.

For the former, the categories of gender, health, and poverty are more frequently found. In the gender category, the promotion of women’s participation in the labor market and other sectors is widely considered to contribute to the SDGs as a whole. [26,28] Additionally, in the health category, the promotion of participation in physical activity and sports is mentioned [33,35,39]. Among these, [35] states that this requires intervention in social, economic, cultural, technological, and environmental inequities. “Effectively addressing the high prevalence of insufficient activity will require identifying, understanding, and intervening on the causes and inequities—social, economic, cultural, technological, and environmental—that can perpetuate the low levels of participation and differences between sexes”.

On the other hand, for the latter, there are many papers in the citizen science and environmental categories. The paper on citizen science provides a comprehensive perspective, such as creating opportunities for participation through the formation of citizen science projects [11], improvement of civic literacy and human resource development through project [10], gaining ownership through participation in research projects [7] and the potential for monitoring SDG indicators through citizen science [5]. There are also issues such as securing funding for citizen science projects and treating projects only as a source of data; however, as [6] explains, “As a rapidly growing and transforming field, citizen science has considerable potential to interact with the fast evolving SDG process, not just as a source of data that could fill gaps or improve rapid response to disasters, but as a science-driven approach that places citizens at the heart of SDG monitoring. Citizen science provides the public with the means to inform policy, which could raise trust, credibility and ultimately accountability in the SDG monitoring process. Moreover, engaging with citizens in the data collection process, and in research more generally, could create opportunities to stimulate citizen action. Implementation of the SDGs requires changes to existing decision-making procedures and practices across governance structures, economic sectors and society at large. Citizen science not only ‘delivers’ more complete and timely data but can also
trigger shifts in governance structures and accountability, which imply changes for public authorities in terms of both the basis for their decisions (what evidence and how this is taken into account) as well as in their interactions with the public in terms of continuity and responsiveness”.

In the environmental category, given the challenges of difficulty in taking ownership, uncertainty about the future, and asymmetry of costs and benefits, they use methods such as scenario development and multi-stakeholder dialogues. In scenario development, the issues are presented, such as prevent exclusion from the decision-making process and ensure diversity of participants [18], avoiding impacts from Power Dynamics [23]. On the other hand, the need to gather information through multi-stakeholder dialogues as a means of ensuring information transparency is also mentioned [21].

In the education category, the study also analyzes the development of independence and the promotion of participation through school education. As described below, both studies focus on information literacy [13,14].

Papers also exist that describe new forms of participation using digital technology. The study in [22] addresses Participatory Sensing. The study in [40] discussed Improvement in the museum experience using visitor sensing. The study [44] covered the smart city. In each case, the participants also become data generators through digital technology, and the data are used to promote further participation.

3.2.2. Information

Next, we examined how information is handled in these participations, which can be broadly categorized as follows.

- Information literacy [10,13,15].
- Information Access and Information Gaps [11,14,21,23,32,34].
- Promoting participation by providing information and changing from passive to active participation [5,7,9,12,18,20,27,40].
- Insufficient and supplemental information [6,29,38].
- Information Hub and Information Infrastructure [44].

With regard to information literacy, studies are being conducted on the development of abilities required for the use and interpretation of information. With regard to information access and information gaps, the current bias in information accessibility, which is a barrier to participation, is seen as an issue to be addressed. Regarding the promotion of participation and the change from passive to active participation through the provision of information, the significance of not only the top-down provision of information but also the participants’ own generation of information and their active, rather than passive, involvement in the information through this process are discussed. Regarding the lack of and supplemental information, as mentioned above, the lack of detailed information sources necessary for SDG monitoring is seen as an issue, and supplemental information is being considered through the generation of the above-mentioned information. Finally, the Information Hub and Information Infrastructure are considering the infrastructure for collecting and utilizing information in this overall context.

4. Discussion and Conclusions

In recent studies on the SDGs, we have examined how citizen participation has been handled. In addition, we have also examined how “information” has been handled in this process. Since this is a paper targeting the SDGs, the research themes are wide-ranging, but there are common issues regarding “participation” and “information,” and these are extracted below.

(A) Necessity of participation: The achievement of the SDGs and efforts toward each goal require the proactive participation of citizens.
(B) Challenges in participation: One of the factors hindering participation is the existence of biased information access and information gaps, which deprive people of opportunities to participate in decision-making and reduce their sense of ownership.

(C) Promoting participation: Appropriate provision of information can promote participation. In this process, the participating actors themselves can be the generators of information, which will enhance their sense of ownership. Key words: enhancement of information and scientific literacy; diversity of participants/multi-stakeholder; transparency of information; and motivation.

(D) Contribution to the SDGs: Increased participation as information generators could contribute to the acquisition of more detailed data on the SDGs, which is currently lacking.

(E) Basis for participation: The use of technology and the development of information infrastructure and the formation of smart cities may encourage the acquisition and generation of such information.

As mentioned in the Introduction, the achievement of the SDGs requires the participation of diverse actors. In promoting the participation of diverse actors, it is particularly necessary to promote participation at the citizen level.

The availability of information is a challenge for participation. Deteriorating health, poverty, and gender inequality are caused by a lack of information available to those affected and their inability to participate in efforts to improve their situation. In addition, it is difficult for citizens to participate in environmental and climate change issues if they do not know how their lives will be affected by the situation.

Therefore, ensuring that information can be obtained appropriately may promote participation. In this case, not only is information provided in a top-down manner, but citizens themselves can participate in surveys and research activities and also become the generators of information, which may lead to a greater sense of ownership by participants. For this reason, it is important that programs to improve information and scientific literacy be offered at school sites and elsewhere. In addition, it may be important to discuss issues such as the creation of places to gather diverse participants, the creation of mechanisms to motivate them, and how to maintain the transparency of information.

In addition, citizens themselves becoming the main actors in research and information generation will not only promote their participation in the SDGs but may also lead to better monitoring of their achievement. Some of these data sets are currently unavailable. Increasing the acquisition of information at the local and citizen levels could lead.

Finally, technology can be a driver in promoting the acquisition and generation of information by these citizens. By establishing infrastructures such as smart cities and data infrastructures, they will function as information hubs and promote further information acquisition and generation.

In this regard, in implementing initiatives to promote citizen participation with a focus on information, awareness of the above cycle from (B) to (E) may lead to more effective implementation.

Note that this paper has certain limitations. First, it includes papers that do not necessarily focus on “citizen participation” because the top 40 most cited papers were included among the papers that corresponded to the search. The study [17] fits this description. In addition, we are aware of a larger number of papers on promoting citizen participation in smart cities and other topics. We plan to additionally review these papers in the course of future research. This paper is positioned as an introductory study, and while it shows a certain importance of “information sharing” regarding citizen participation, more thorough research is needed. In the future, the analysis will focus more on previous studies on information sharing, as well as other issues.

Finally, this paper serves as the basis for a process of action research that is planned for the future. The eventual implication of this study is to identify the factors that promote citizen participation through the action research process. Prior to this research, this paper aimed to identify issues that have been discussed in recent studies on promoting citizen participation. After conducting research on the SDGs in Japan, particularly on the status
of citizen participation, the author plans to conduct action research in Tosacho Town, Kochi Prefecture, Japan, where the author lives. This research will be conducted with the abovementioned cycle for promoting participation in mind.

**Author Contributions:** Conceptualization, Y.O.; methodology, Y.O.; formal analysis, Y.O.; resources, Y.O.; writing—original draft preparation, Y.O.; writing—review and editing, Y.O.; supervision, R.S. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

**References**

2. Cooper, H.M. Organizing knowledge syntheses: A taxonomy of literature reviews. *Knowl. Soc.* 1988, 1, 104. [CrossRef]
17. Loizia, P.; Voukkali, I.; Zorpas, A.A.; Pedreno, J.N.; Chatziparaskeva, G.; Inglezikis, V.J.; Vardopoulos, I.; Doula, M. Measuring the level of environmental performance in insular areas, through key performed indicators, in the framework of waste strategy development. *Sci. Total Environ.* 2021, 753, 141974. [CrossRef]
19. Pinto, L.; Ferreira, C.S.S.; Pereira, P. Environmental and socioeconomic factors influencing the use of urban green spaces in Coimbra (Portugal). *Sci. Total Environ.* 2021, 792, 148293. [CrossRef]
29. Almeida, A.C.L. Multi actor multi criteria analysis (MAMCA) as a tool to build indicators and localize sustainable development goal 11 in Brazilian municipalities. *Heliyon* 2019, 5, e02128. [CrossRef]
30. Anderson, C.R.; Bruil, J.; Chappell, M.J.; Kiss, C.; Pimbert, M.P. From Transition to Domains of Transformation: Getting to Sustainable and Just Food Systems through Agroecology. *Sustainability* 2019, 11, 5272. [CrossRef]
36. Leuenberger, A.; Farnham, A.; Alcaraz-Segura, D. Digital conservation in biosphere reserves: Earth observations, social media, and nature’s cultural contributions to people. *Conserv. Lett.* 2013, 16, e12704. [CrossRef]
40. Cappa, F.; Rosso, F.; Capaldo, A. Visitor-Sensing: Involving the Crowd in Cultural Heritage Organizations. *Sustainability* 2020, 12, 1445. [CrossRef]