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# Combining Participatory Processes and Sustainable Development Goals to Revitalize a Rural Area in Cantabria (Spain)

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**Abstract:** Due to industrial civilization, the decline of the countryside has become a global phenomenon. Spain is a good example that reflects this issue in the rural areas of the European Union because more than half of all municipalities in the country are at risk of extinction. This manuscript aims at combining social engagement and the application of sustainable development goals (SDGs) to propose a sustainable rural revitalization plan. Several multi-sectoral working groups participated in three consultation rounds to prescribe 52 customized actions directed to Pesquera-San Miguel de Aguayo area. Social (17) and environmental (16) dimensions collected the highest number of initiatives, whilst the institutional dimension was only addressed by eight proposals. Furthermore, 40 out of the 169 SDG targets of the 2030 Agenda were put forward in the rural strategy, which also contemplated most priorities adopted by the Rural Development Programme for Cantabria. A cooperative association was identified as the most preferred governance system in order to build a community spirit and promote social empowerment, inclusiveness, and gender equality. Municipal and regional authorities were not invited to join the participatory process in order to not constrain the involvement of the selected stakeholders.

**Keywords:** rural revitalization; sustainable rural development; sustainable development goals; depopulation; land consolidation; social participation; capacity building; Delphi method

## 1. Introduction

Most regions of the European Union (EU) are being affected by depopulation, low fertility rates, and aging populations [1]. As a consequence, a population decline is expected in one third of the EU regions from 2008 to 2030 [2]. Whilst people living in cities have paradoxically decreased to 39.3% of the entire population, the number of residents in rural areas, and towns and suburbs of the EU has experienced a gradual increase in 2018 to reach 29.1% and 31.6% of all inhabitants, respectively [3]. The development of more affordable areas in which to live close to urban centers in the countryside, suburbia, or towns justifies such suburbanization trends [4,5]. The growth of rural areas is thus associated with the lasting prosperity of cities [6]. However, population inflows to rural areas are uneven according to the country examined. By contrast with other nations of Western Europe, Spain has suffered the consequences of a rapid and intense process of rural depopulation known as "empty Spain" with a demographic density in the rural realm less than three inhabitants per km$^2$ [7]. Around 5000 out of a total of 8125 Spanish municipalities are at risk of extinction in the medium term because their population is under one thousand residents, and 1286 of them have less than 100 people [8].

Diverse approaches describe the notion of "rural" as those communities that depend on the primary sector [9]; areas with a limited population size and density [10]; a socio-ecological system [11]; or an amalgamation of natural, economic, and social components [12]. The definition and delimitation

of rural areas in the EU are mainly drawn for statistical and administrative purposes. In this vein, the EU characterizes rural areas as those that are outside urban clusters and have a density below 300 inhabitants per $km^2$ and a maximum population of 5000 people [13]. Although the Spanish National Statistics Institute defines rural areas as those with less than 2000 inhabitants, Article 3 of the prevailing Spanish Law on Sustainable Development in Rural Areas [14] determines that the density and population of rural municipalities cannot exceed respectively 100 inhabitants per $km^2$ and 5000 residents.

The global phenomenon of rural decline [15] results in a decrease of population, deindustrialization, and economic recession in the countryside due to the population shift to cities [16], which can lead to poverty and social exclusion [17]. Rural revitalization seeks to reverse the deterioration of rural areas through an integrated and comprehensive process [18] that involves economic development and improvement of the quality of life [19]. The local economy, social environment, cultural heritage, physical environment, and political background are the main components of a holistic approach that connects rural transformation and sustainable development [20,21]. A sound governance system and the improvement in governance capacity are also two cornerstones of rural revitalization [22] that can be boosted by the combination of top-down policies and bottom-up participation [23]. EU countries are implementing rural development programs (RDPs) prepared on the national or regional basis by covering at least four of the six priorities of the European agricultural fund of rural development for this purpose. More than 5% of all EU-funded projects to develop the countryside must be grounded on a "bottom-up" approach that involves rural producers, local organizations, municipal authorities, and other individuals [24].

Over the last few decades, a wide literature has been focused on rural development worldwide. Ono [25] analyzed the reduction of community-based autonomy in rural areas, whilst Odagiri [26] examined rural community marginalization as a result of depopulation. Social engagement toward the revitalization of the countryside areas was studied by Elshof and Bailey [27]. Long et al. [28] analyzed effects of the allocation of population, land resource, and capital in the rural restructuring of China. Rural diversification as a strategy to handle main rural challenges was primarily oriented to reduce livelihood vulnerability [29] and encourage land consolidation [30]. In this vein, a portfolio of varied economic activities [31], technology and innovation [32], multi-functional agricultural activities [33], agro-tourism [34], and public-private partnerships [35] are prominent components of a booming rural economy. Changing socio-economic conditions in rural Australia were evaluated by Cocklin and Dibden [36], and Thu [37] discussed the governmental support to rural industry in Japan. Traditional villages and an international ski resort served to boost rural revitalization in China [38] and Sweden [39], respectively. Fernandez, Gajardo, and Saez [40] explored the abandonment of farmland in the Argentinian Pampas. The rural repopulation in Portugal [41] and rural gentrification in the United States [42] were also reviewed. In Spain, Escolano [43] stressed the role of territorial planning on the reactivation of Tabernas region and criticized the limited social participation in the definition of intervention strategies. Several grassroots development initiatives focused on natural resources were undertaken by local people of four remote rural areas in Galicia [44].

The adoption of the 2030 Agenda for Sustainable Development at the United Nations World Summit in September 2015 served to define the 17 Sustainable Development Goals (SDGs) to be achieved by 2030 in order to face main global challenges [45]. Although 169 targets and 232 indicators were set to cover the broad range of specific topics involved, explicit references to rural areas were scant. The SDG target 2.A assesses investment in rural infrastructure, whilst indicators 1.1.1 and 4.5.1 measure rural population below the international poverty line and parity indices for all education metrics in the countryside, respectively. The proportion of rural population living within 2 km of an all-season road is appraised by indicator 9.1.1.

This literature review displays a gap in knowledge regarding the use of participatory processes that encompass the principles of the 2030 Agenda to revitalize the countryside. As the Spanish region of Cantabria shares many commonalities with other European regions, this case study may

be applicable to most rural areas in the EU. On the basis of the Rural Development Programme for Cantabria (RDPC) adopted by the European Commission in July 2015 and last modified in December 2019 [46], this research presents a "bottom-up" approach designed to engage key rural stakeholders in the elaboration of a feasible action plan aligned to the RDPC and the SDGs, which aims at paving the way for upcoming sustainable strategies to reactivate depopulated rural areas. There are several contributions to be underlined. First, the study helped to divulge the SDGs among stakeholders and the rural population, mainly elderly people, who were unaware of global endeavors toward sustainable development. Furthermore, a sound methodology was proposed through a cross-sectoral participatory process rooted in the Delphi technique that implicated separate working groups by gathering agricultural experts and entrepreneurs, local residents, and environmentalists to define a consensus plan. That approach can be also employed to effectively implement the 2030 Agenda in rural municipalities. Finally, the research delivered new insights to be incorporated into a regional policy framework from a practical and business point of view.

The following section presents the methodology of the study. Section three conducts all stages of the research, including the selection of intervention areas, the performance of the working teams, and the interlinkage between the rural plan and the SDGs. The conclusions of the article are summarized in the final section.

## 2. Materials and Methods

Bottom-linked governance stresses the interactive relations between political authorities and civil society actors [47] to strengthen a more inclusive governance at the local level [48]. The effective implementation of policies and projects that contribute to enhance sustainability in rural areas requires a strong engagement of communities. However, the combination of bottom-up and top-down initiatives often causes tensions [49] due to the predominant role played by some public agents which deters local actors from participating in decision-making processes [50]. To minimize that risk, the participation of local and regional authorities in the development of the rural strategy was not considered at this stage. However, the institutional deadlock due to potential disputes between regional and local authorities was identified as a significant threat in the revitalization of the selected countryside areas when executing the plan.

A three-tiered methodology was proposed to conduct the research, as shown in Figure 1. A multidimensional analysis of Cantabria was initially performed to determine in which rural areas a comprehensive plan has to be designed. Diverse working groups then outlined initiatives to revitalize the countryside. In the last phase, those actions were linked to the SDGs.

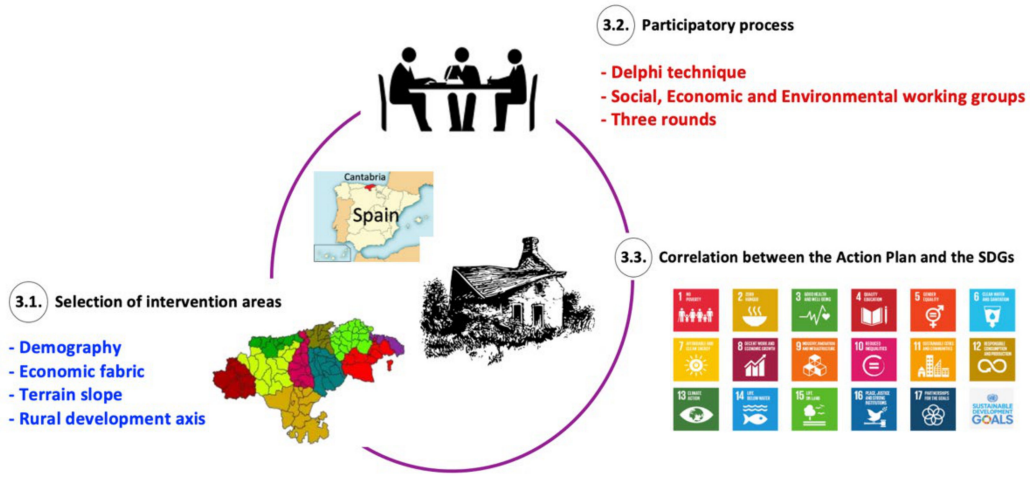



**Figure 1.** Stages of the methodology.

### *2.1. Assortment of Areas for Action*

A period of study from 2005 to 2018 was deemed to reflect the Spanish economic boom of mid-2000 and the subsequent financial crisis a few years later. Furthermore, a demographic breakdown of Cantabria was carried out in order to identify rural areas at risk of severe depopulation. The Institute for Statistics of Cantabria (ICANE) [51] provided population data in terms of total people, fertile women, and working and retired population. Moreover, the evolution of the immigrant collective in the region was also scrutinized. The analysis of the gross domestic product (GDP) by sector could help us to recognize those economic activities in the region to be strengthened or promoted. Terrain slope was another factor examined [52] because local relief conditions strongly affect the use of land for agricultural purposes. Finally, the delineation of a social-economic development axis that connects rural and urban settlements was also regarded as a potential trigger for growth in the rural realm [50].

### *2.2. Work in Groups*

#### 2.2.1. Composition of Working Groups

Distinct working teams were formed with the aim of addressing separately social, economic, and environmental issues. To this end, the 17 SDGs were clustered into the sustainability dimensions to be mainly pondered by each group. Economic opportunities were discussed by a panel of four entrepreneurs whose core business activities were primarily located in Cantabria. This group comprised a farmer, a meat producer, an entrepreneur in the tourism sector, and a representative of the food processing industry. Between four and six adults born in and currently resident of the selected rural areas expressed their views about social questions affecting their communities. At least one woman would be part of the panel to provide insights related inter alia to gender equity. The snowball sampling technique [53] began with the initial appointment of one person by any of the four entrepreneurs who helped him/her recruit the remaining members of the team. An environmentalist, a wildlife expert, and a professional in green energies with long experience in Cantabria assessed the environmental facet.

#### 2.2.2. Participatory Process

The Delphi technique was originally developed as a systematic and interactive method based on the principle that forecasts or decisions from a structured group of people are more accurate than those from unstructured groups. The panel of experts is coordinated by a facilitator [54]. As illustrated in Figure 2, workshops bring key stakeholders together in a group session to achieve certain goals. Workshops and Delphi methods were combined in this research to agree on an effective rural plan for the depopulated areas after three consultation rounds. A questionnaire was given to each group so that the facilitator collected, analyzed, and identified converging and diverging views after sharing feedback received with the other panels. An individualized thematic group session allowed us to build consensus on different points according the goals defined for each round. A further round was launched by sending a new form. A period of two weeks was set between the date of the mailing of the survey and the start of subsequent workshop sessions.

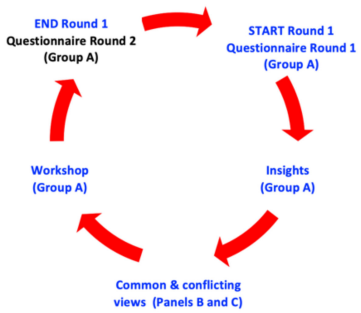



**Figure 2.** Steps followed in each consultation round.

Key information about the 2030 Agenda, the SDGs assigned to each thematic group (Table 1), the priorities and the SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis included in the RDPC, and a questionnaire were circulated to all participants to commence the first round. Since diverse SDGs such as SDG11, SDG12, SDG16, and SDG17 were allotted to all panels, the initial workshop would address potential disputes that arose in the group distribution of the SDGs. The adoption of at least four of the six RDP priorities (Appendix A Table A1) as a main reference, the preferred SDGs for action, and preliminary proposals for each SDG were the expected outcomes of the beginning phase. The questionnaire of the second stage consisted on a compilation of all basic actions suggested by the panelists to be graded on a scale of 0 to 10. Initiatives with scores close to acceptance criteria would be discussed in workshops by examining pros and cons to reach an agreement on their inclusion or exclusion on an inventory of actions to be detailed in the last phase. Furthermore, issues that arose in the first round would be also handled. In the third round, participants described in detail the customized strategies to be implemented in the selected rural areas on the basis of the refined list of generic initiatives arranged in the previous round.

**Table 1.** Sustainable development goals (SDGs) initially allocated to working teams.

| SDG# | Description | Thematic Group | | |
|---|---|---|---|---|
| | | Social | Economic | Environmental |
| 1 | No poverty | √ | √ | |
| 2 | Zero hunger | √ | | |
| 3 | Good health and well-being | √ | | |
| 4 | Quality education | √ | | |
| 5 | Gender equality | √ | | |
| 6 | Clean water and sanitation | | | √ |
| 7 | Affordable and clean energy | | | √ |
| 8 | Decent work and economic growth | | √ | |
| 9 | Industry, innovation and infrastructure | | √ | |
| 10 | Reduced inequalities | √ | √ | |
| 11 | Sustainable Cities and Communities | √ | √ | √ |
| 12 | Responsible Consumption and Production | √ | √ | √ |
| 13 | Climate action | | | √ |
| 14 | Life below water | | | √ |
| 15 | Life on land | | | √ |
| 16 | Peace, justice and strong institutions | √ | √ | √ |
| 17 | Partnerships for the goals | √ | √ | √ |

### *2.3. Correspondence between the Action Plan and the SDGs and the RDPC*

Although the principles of sustainable development were initially assumed as the base of the rural strategy to be defined, the level of correlation between the proposed actions and the SDGs was necessary to determine their alignment with the 2030 Agenda. In this sense, each initiative agreed to by the working groups was associated to SDG targets through a comparison of their scopes. Furthermore, the revitalization rural plan was benchmarked against the Rural Development Programme for Cantabria in order to suggest new measures to strengthen the existing policy framework.

## 3. Results

This section presents an overview of Cantabria, as well as findings from the application of the methodology prescribed above, namely selection of the rural areas to be strengthened, public participation in the formulation of the action plan and linkage of the proposed initiatives with the SDGs.

*Overview of Cantabria*

Cantabria is a region in the north of Spain bathed by the Cantabrian Sea, whose capital is the city of Santander. The total land area is 5326.54 km$^2$ and represents 1% of the national territory. Farmland covers 40.5% and forestry 51% of the total area. Nearly 40% of the territory is above 700 meters of altitude and around 33% presents steep slopes higher than 30%. At the end of 2018, about 581,685 inhabitants populated the 102 municipalities of Cantabria grouped into 10 counties [51]. Gross domestic product (GDP) in 2018 was €13.8 billion (€23,726 per capita), representing 1.1% of the Spanish GDP [55]. The analysis of the GDP by industrial sectors could not be held because ICANE does not account for those data since December 2007. At the end of 2018, the unemployment rate in Cantabria was 9.68%.

Figure 3 shows the trend of the total number of inhabitants over the 14 years examined. The regional population steadily increased by 5.6% from 2005 (561,038) to the peak in 2011 (592,393). A slight reduction of 1.8% was then experienced until 2018, when the population in Cantabria was 581,685 people. Since the Spanish law fixed the employment age between 16 and 67 years for women and men, Figure 4 reflects the pattern of working population and people aged 67 or over, which presents similarities to that of the entire population. Employable people rose by 4.8% up to 2009 and subsequently decreased by 5.6% until 2018, representing an overall loss of 1% in the 14 years reviewed. The year 2018 brought the lowest proportion of persons of working age (66.66%). By contrast, a constant growth of 16.7% in the retired population was observed during the period under study, reaching 18.48% of total inhabitants in 2018.

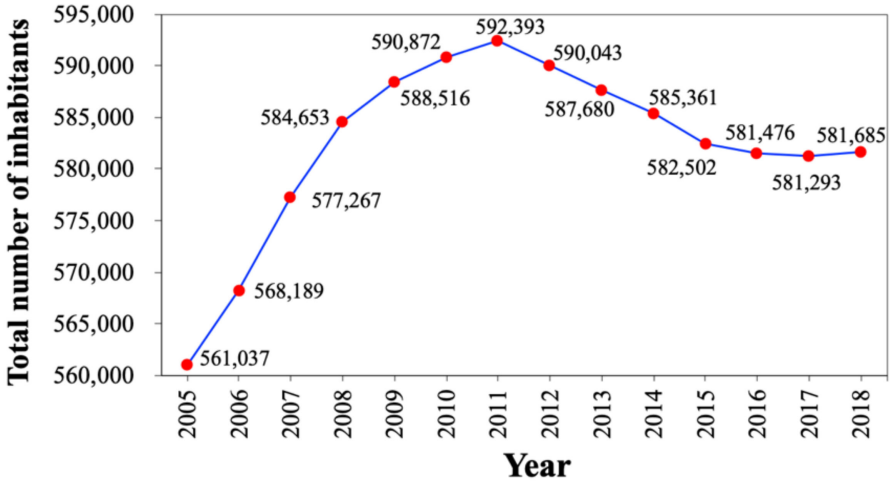



**Figure 3.** Total inhabitants in Cantabria from 2005 to 2018 [51].

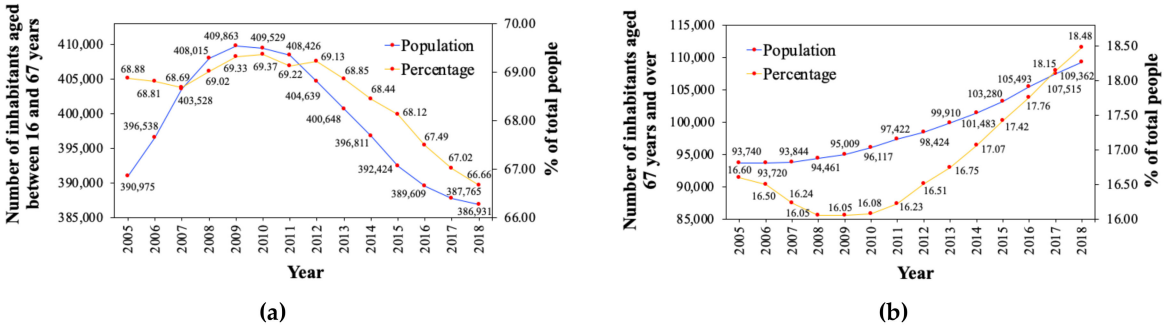



**Figure 4.** Population aged 16 to 67 (**a**) and 67 and over (**b**) from 2005 to 2018 [51].

The quantity of fertile women, aged 15 to 49 [56], stayed flat from 2005 to 2009. Since then, a gradual decline of 13.8% was registered until 2018 to reach 41.24% of all female residents (Figure 5). Although the proportion of immigrant population did not exceed 5% of the total number of residents in Cantabria, the contribution of immigrants in regional workforce is relevant. Figure 6 illustrates the distribution of foreign inhabitants by year and geographical area of origin. From 2005 to 2010, the number of immigrants grew by 47.3% before decreasing by 26.4% in the next seven years. Instead, a rise of 6% was experienced in 2018. A sustained fall of 4.8% in non-EU people was noted over the study period, whilst inhabitants from North America rose consistently by 24.8%. Statistics of citizens from Africa and Central America and the Caribbean soared by 89.1% and 79.2%, respectively. However, the highest growth rate corresponded to Asian residents with a value of 183.3%. The trend of population from South America was uneven, immigrants raised from 9705 to 15,080 during the first five years, after which they decreased to 8570.

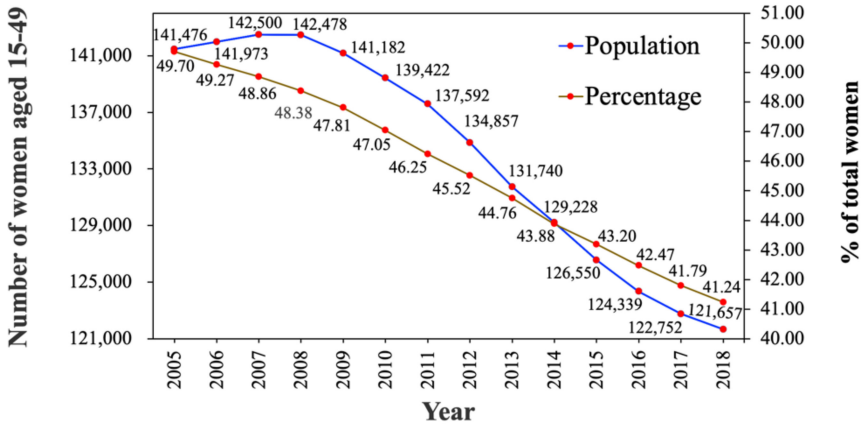
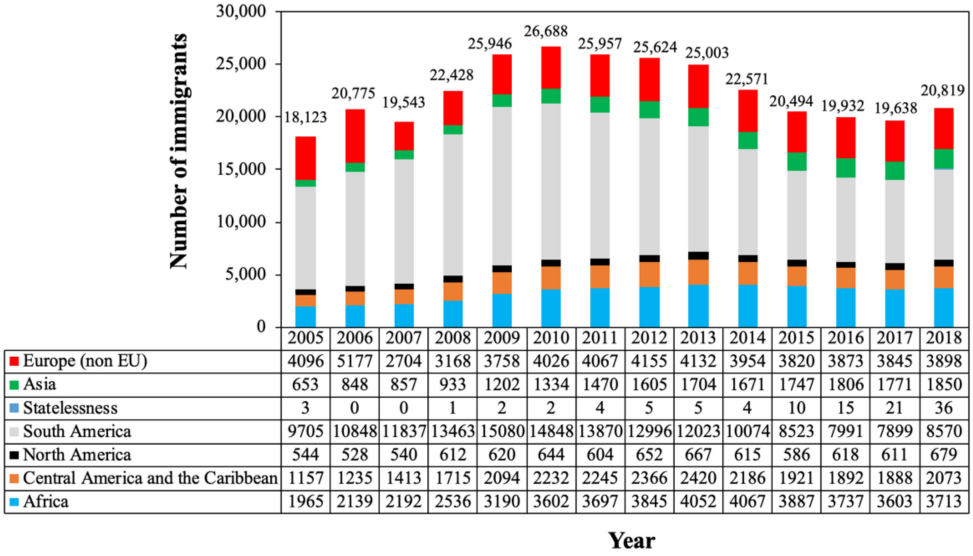



**Figure 5.** Females of childbearing potential (aged 15-49) in the 2005–2018 period [51].




| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Europe (non EU) | 4096 | 5177 | 2704 | 3168 | 3758 | 4026 | 4067 | 4155 | 4132 | 3954 | 3820 | 3873 | 3845 | 3898 |
| Asia | 653 | 848 | 857 | 933 | 1202 | 1334 | 1470 | 1605 | 1704 | 1671 | 1747 | 1806 | 1771 | 1850 |
| Statelessness | 3 | 0 | 0 | 1 | 2 | 2 | 4 | 5 | 5 | 4 | 10 | 15 | 21 | 36 |
| South America | 9705 | 10848 | 11837 | 13463 | 15080 | 14848 | 13870 | 12996 | 12023 | 10074 | 8523 | 7991 | 7899 | 8570 |
| North America | 544 | 528 | 540 | 612 | 620 | 644 | 604 | 652 | 667 | 615 | 586 | 618 | 611 | 679 |
| Central America and the Caribbean | 1157 | 1235 | 1413 | 1715 | 2094 | 2232 | 2245 | 2366 | 2420 | 2186 | 1921 | 1892 | 1888 | 2073 |
| Africa | 1965 | 2139 | 2192 | 2536 | 3190 | 3602 | 3697 | 3845 | 4052 | 4067 | 3887 | 3737 | 3603 | 3713 |

**Figure 6.** Immigrants registered in Cantabria by geographical region of origin from 2005 to 2018 [51].

The map of Figure 7 was created according to the provisions of the Spanish Law on Sustainable Development in Rural Areas. Thus, 67 out of the 102 municipalities of Cantabria are considered to be rural areas because they have a population and density under 5000 people and 100 inhabitants per km$^2$, respectively. A high number of regional villages (27) suffers from a severe depopulation as reflected in a density value less than 10 people per km$^2$. Meanwhile, only 12 rural towns showed a density greater than 50 residents per km$^2$.

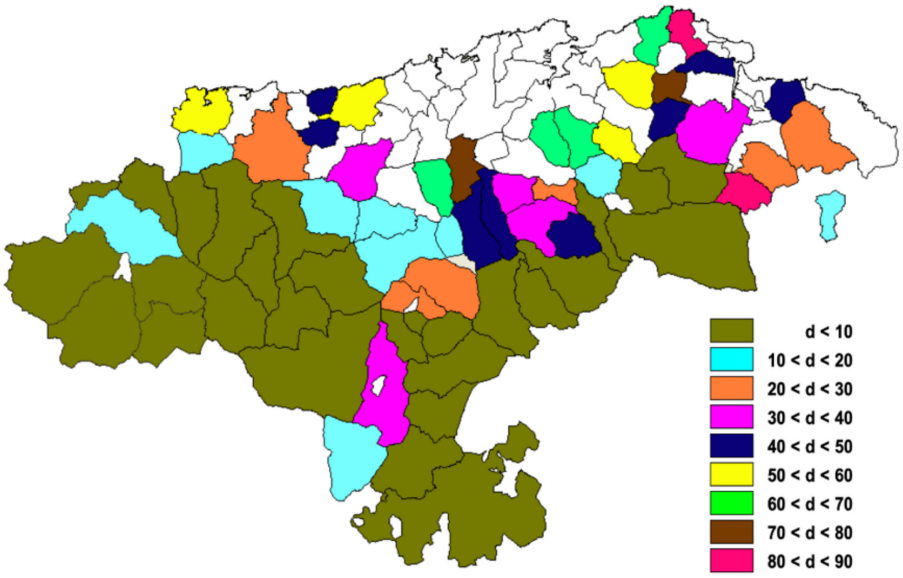



**Figure 7.** Population density (d) of rural municipalities in Cantabria (inhabitants per km$^2$) [51].

During the 2005–2018 period, the demographic analysis of Cantabria revealed significant outcomes. Although the regional population grew 3.6% in that time, working people decreased 1% and pensioners rose 16.7%. A decline of 17.2% was also noted in women of child-bearing age. The immigrant population showed a similar trend to the overall population. Foreigner residents thus increased by 14.9%, displaying an uneven distribution per area of origin. People from Central America and the Caribbean, Asia, and Africa rose substantially. A slight reduction of inhabitants from South America and non-EU countries was also observed. The exam of rural municipalities disclosed that 27 of them are at risk of extinction due to a very low density (less than 10 inhabitants per km$^2$).

### *3.1. Selection of Areas to Be Intervened*

Demographic features, GDP by economic activity, terrain orography, and the creation of social and economic hubs were the factors analyzed to identify the countryside areas to be revitalized. From 1970 to 2000, Valdeprado, San Pedro del Romeral, San Roque de Riomiera, Miera, Pesquera, Tudanca, Polaciones, and Tresviso showed a decrease in the amount of residents by more than half [51]. Those villages and others with less than 600 people in 2005[1] were therefore deemed in the estimate of population over the next decade, as illustrated in Figure 8. San Pedro del Romeral (299), San Roque de Riomiera (207), Miera (155), and Arredondo (153) are the municipalities where the major reduction in the number of residents is expected in 2030, as per ICANE studies [51]. Furthermore, Polaciones (185), San Miguel de Aguayo (143), Tudanca (82), Tresviso (71), and Pesquera (50) present the lowest number of inhabitants by the year 2030 and were thus shortlisted as potential rural areas to be reactivated. An insignificant variation on the quantity of people in San Miguel de Aguayo and Tresviso is projected from 2005 to 2030.

[1] 600 inhabitants in the 2005 population forecast was set as a threshold because that amount was roughly the population of San Pedro del Romeral in 2005, one of the villages with a population drop greater than 50% in the period from 1970 to 2000.

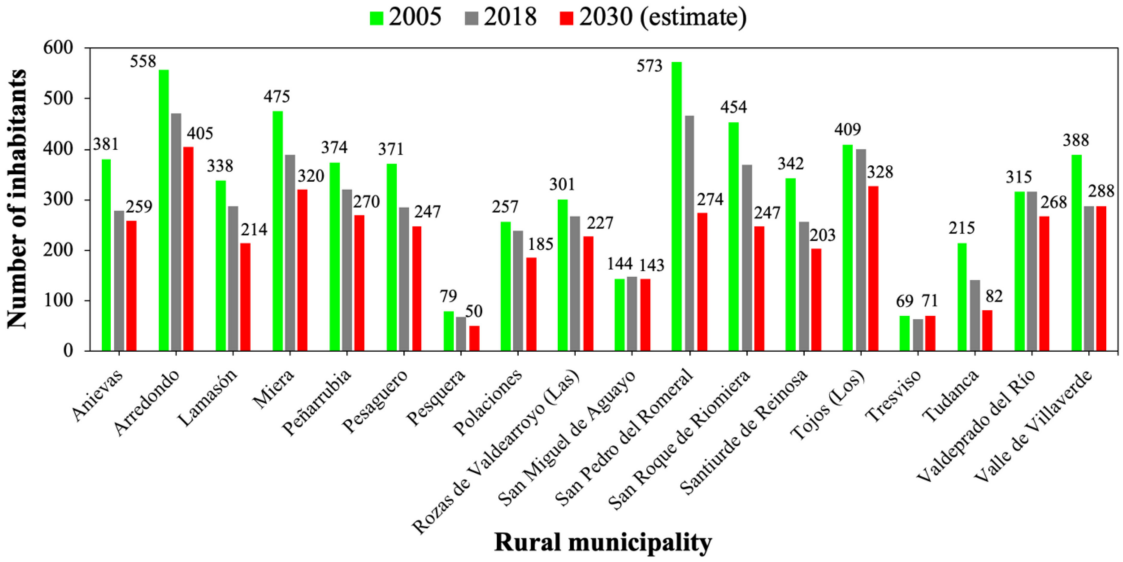



**Figure 8.** Population forecast of the most depopulated rural areas from 2005 to 2030 [51].

As shown in Table 2, population statistics from 2018 [51] revealed that Tresviso (64) and Pesquera (68) were the most unpopulated areas, in contrast to San Miguel de Aguayo (147) and Polaciones (232). Whilst San Miguel de Aguayo reflected the lowest male ratio at 51.7%, the rest of villages surpassed 60%. The proportion of fertile women living in the targeted municipalities was less than 34%, presenting San Miguel de Aguayo and Tresviso, respectively, as having the best (33.8%) and the worst (10%) statistics. Employable people in all localities fluctuated between 60.3% and 70.3% of the whole population. The analysis of ageing rate also disclosed that men 67 or over in Polaciones, Pesquera, and Tresviso ranged from 29.5% to 34.9% of the male population, in contrast to San Miguel de Aguayo and Tudanca with less than 22.5%. The quantity of aged women was significantly greater than that of men in the same municipalities. For instance, Tresviso and Tudanca showed a gap of 20.5 and 24.8 percentage points between aged female and male rates.

**Table 2.** Main demographic data of the five selected municipalities of Cantabria in 2018 [51].

| Municipality | Population | | | Working/Retired People | | Women | Male (%) | Ageing Rate (%) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Male | Female | 16–67 | 67 and Over | 15–49 | | Total | Male | Female |
| Pesquera | 68 | 43 | 25 | 41 | 25 | 5 | 63.2 | 36.8 | 34.9 | 40.0 |
| Polaciones | 232 | 147 | 85 | 150 | 74 | 22 | 63.4 | 31.9 | 27.8 | 36.8 |
| San Miguel de Aguayo | 147 | 76 | 71 | 94 | 38 | 24 | 51.7 | 25.9 | 22.4 | 29.6 |
| Tresviso | 64 | 44 | 20 | 39 | 23 | 2 | 68.8 | 35.9 | 29.5 | 50.0 |
| Tudanca | 138 | 97 | 41 | 97 | 39 | 11 | 70.0 | 28.3 | 20.4 | 45.2 |

The economic fabric of villages was not examined due to the dearth of data about the GDP by economic sector [51]. However, insights of social and economic working groups can help to bridge this gap by recommending valuable actions geared to both dimensions. Moreover, the study of topographic relief is key to find suitable land for agricultural activities and prevent soil erosion because 5.6% of farmland in Cantabria has gradients of less than 4% [46]. In this vein, García Nájera [52] theorized that erosion starts when the slope of ground is between 2% and 3%. The five localities under examination are settled in rugged terrain showing different values of the height above sea level—namely, Pesquera (621 m), Polaciones (900 m), San Miguel de Aguayo (831 m), Tresviso (848 m), and Tudanca (485 m). Cartography on the website of the Spanish National Geographic Institute [57] served to discover the

largest surfaces of land with slopes lower than 3% in Pesquera and San Miguel de Aguayo. However, it was not technically possible to quantify the area used for agricultural purposes.

Proximity between the selected villages was reflected in Figure 9. San Miguel de Aguayo and Tudanca are within 10 kilometers of Pesquera and Polaciones, respectively. That fact suggests the consideration of Pesquera-San Miguel de Aguayo and Tudanca-Polaciones as rural clusters that can play a leading role in the social-economic development of Cantabria [58]. On the other hand, Tresviso is located more than 90 kilometers far from the other four municipalities. Pesquera is also adjacent to the A-67 motorway that links Cantabria and the region of Castilla y Leon. Since a convenient access of rural clusters to urban centers promotes the development of social-economic hubs [59] and facilitates primary services such as education, healthcare, and transports [60], the distance between the analyzed rural areas and the greatest cities of Cantabria—namely, Santander (172,539 inhabitants) and Torrelavega (51,494 residents)—was also assessed. Pesquera and San Miguel de Aguayo were the closest localities to both cities in comparison to Tudanca, Polaciones, and Tresviso.

| | Pesquera | Polaciones | San Miguel Aguayo | Tresviso | Tudanca | Torrelavega | Santander |
|---|---|---|---|---|---|---|---|
| Pesquera | | 97.7 | 8.4 | 145.0 | 87.5 | 37.9 | 64.3 |
| Polaciones | 97.7 | | 104.00 | 97.5 | 9.5 | 67.00 | 94.0 |
| San Miguel Aguayo | 8.4 | 104.0 | | 152.0 | 93.8 | 46.0 | 73.6 |
| Tresviso | 145.0 | 97.5 | 152.00 | | 90.9 | 104.0 | 131.0 |
| Tudanca | 87.5 | 9.5 | 93.8 | 90.9 | | 61.6 | 88.6 |
| Torrelavega | 37.9 | 67.0 | 46.0 | 104.0 | 61.6 | | 27.0 |
| Santander | 64.3 | 94.0 | 73.6 | 131.0 | 88.6 | 27.0 | |

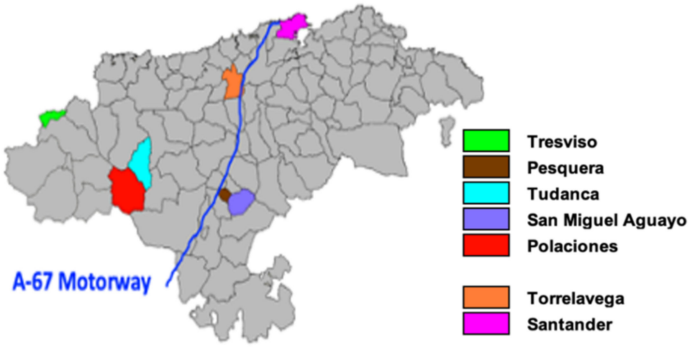



**Figure 9.** Distance in km between the rural areas analyzed and the two greatest urban centers of Cantabria.

The analysis of above aspects determined that Pesquera exhibits the lowest number of current and estimated population, whilst San Miguel de Aguayo has the highest proportion of fertile women. Pesquera is also the nearest municipality to the largest urban settlements such as Torrelavega and Santander, and the only village next to a motorway. The combined study of statistics from the two groups revealed that the expected number of inhabitants in 2030 for Pesquera-San Miguel de Aguayo is 193 in comparison to 267 people for Polaciones-Tudanca (Figure 8). In terms of masculinity ratio, Pesquera-San Miguel showed a lower proportion than Polaciones-Tudanca, whilst the quantity of fertile women is similar in both cases (Table 2). The remote locality of Tresviso displays disturbing statistics in relation to ageing people, male ratio, and fertile women, as well as a poor accessibility. Taking into consideration demography, topography of the land, and the development of social-economic hubs, the cluster Pesquera-San Miguel de Aguayo was selected as the preferential area to be revitalized with the aim of boosting economic opportunities in both villages.

### 3.2. *Performance of Working Teams*

Although the revitalization plan was focused on Pesquera-San Miguel de Aguayo, three local panels were constituted to propose specific social actions from the five municipalities. A farmer, a meat producer, and an entrepreneur in food processing were respectively nominated to find the first resident in Pesquera-San Miguel de Aguayo, Tudanca-Polaciones, and Tresviso, who triggered

the recruitment process for the rest of team members for each cluster. Figure 10 displays the composition of working groups in charge of assessing social issues. Pesquera-San Miguel de Aguayo and Tudanca-Polaciones show a balanced distribution of the six panelists per gender and employability status. Men predominated in the four representatives of Tresviso, whilst the number of working-age people and pensioners was equal.

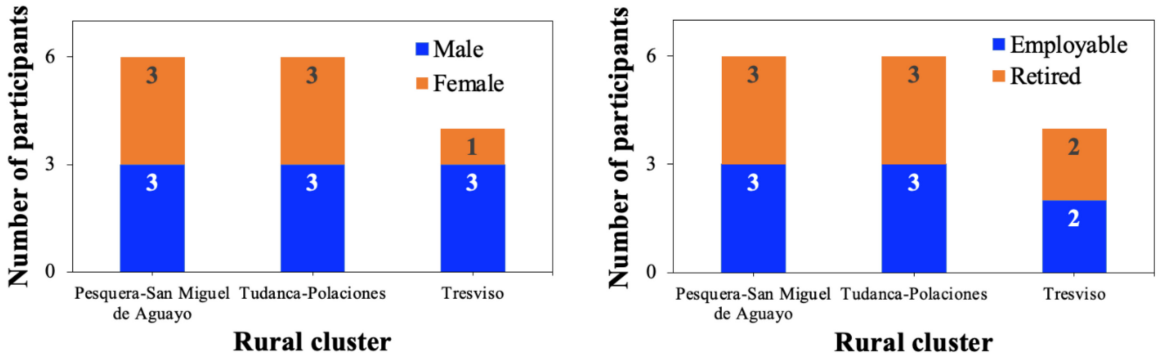



**Figure 10.** Characterization of participants in local working groups.

### 3.2.1. First Round

The 23 members of all teams were invited to select four of the six RDP priorities[2] to mark the main guidelines of the new rural strategy (Table A1) in the questionnaire that started the participatory process in December 2019. Priority 6: Promoting social inclusion, poverty reduction, and economic development was the most voted (22); followed by the Priority 4: Increase the number of youth and adults who have relevant skills (21); Priority 2: Enhancing the viability and competitiveness of all types of agriculture (17); and Priority 1: Fostering knowledge transfer and innovation in agriculture (15). Instead, Priority 5: Restoring, preserving and enhancing ecosystems (7) and Priority 3: Promoting food chain organization (6) were the least valued by respondents. Similarly, the panelists numbered each SDG from 17 to 1 in order to identify the preferred SDGs to which initiatives were directed. The highest scores corresponded to SDG8 (531), SDG12 (443) and SDG13 (437). SDG9, SDG4, and SDG7 ranged from 396 to 310 points, whilst SDG15, SDG5, SDG11, and SDG6 were between 201 and 101 points. The remaining SDGs failed to achieve 100 points. SDG14 was the least appreciated with only 3 points. Diverse generic proposals were posed in connection with issues of the SWOT analysis of the RDPC, but without a clear link to the SDGs, inter alia "organic farming," "livestock exclusion," "immigrants for repopulation," "attraction of young families," "alternatives to traditional rural tourism," "use of biomass from forests," "online commerce," and "cooperativism". In the workshops that completed the first round, participants determined the four priorities and the 10 SDGs that were used as the bases of the action plan. Besides, the general initiatives listed above were specified in greater detail to be included in the survey of the second round, as shown in Table A2. SDG8 and SDG12 each accounted for the largest number (seven) of advised actions, followed by SDG17 with five. Since relevant social matters emerged, further questions were also incorporated into the form (Table A3) to be answered by all 16 local panelists appointed to social panels.

### 3.2.2. Second Round

Responses to queries of Table A3 reflected that 10 out of 16 participants would accept people from different cultures in their villages, but all of them agreed on ensuring a peaceful cohabitation by limiting the number of newcomers to the existing local population. Half of respondents were willing to

[2] According to the EU, all Rural Development Programmes "must work towards at least four of the six priorities of the European Agricultural Fund for Rural Development (EAFRD)" [24].

host people from vulnerable groups (abused women, refugees, etc.). Upon the availability of housing and land to build, between 30 and 50 young families could be home. Whilst 13 participants would join a rural cooperative, only four local interviewees would participate in a land consolidation process to increase agricultural productivity. All 23 members of the working groups scored the 25 actions defined in the workshops of the first round 1 in a scale of 1 to 10 points (Table A2). A minimum of 110 points was required to accept the initiatives proposed. Those actions with scores below that threshold were then discussed in workshops to finally decide their inclusion of rejection in the last round. As a result of the workshops conducted, some actions were definitively rejected such as "use of genetically modified crops," "registration of protected denominations of origin," "implementation of sustainability metrics and reports," "creation of a commonwealth of services," and "high-quality internet access". On the contrary, the remainder were included in the final list of the 20 propositions that served to launch the third round in mid-January 2020.

#### 3.2.3. Third Round

As the goal of the third and last round aimed to describe customized actions to be implemented in Pesquera-San Miguel de Aguayo, the participation of the panelists from Tudanca-Polaciones and Tresviso was not required. Table A4 summarizes some questions raised to depict concrete measures to foster a long-term settlement for young families as requested by most participants. Furthermore, the refined list of 20 actions agreed on in the previous round (Table A5) acted as a point of departure to conclude the participatory process. Questionnaires received were discussed in an ultimate workshop that gathered panelists to define in detail the action plan included in Table 3. Some strategies were suggested to encourage permanent settlement of new residents such as provision of housing and land subject to the duration of the stay, childcare facilities, flexible work for mothers and scholarships for students.

**Table 3.** Revitalization plan correlated to the SDG targets and rural development program (RDP) priorities.

| #.# SDG Target Description | | Action Proposed by Panelists | Dimension | RDP Priority |
|---|---|---|---|---|
| 2.3 | "By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition, and non-farm employment." | Use of hydroponics, greenhouses, vertical farms, digitalization | Economic | 2 |
| 2.4 | "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding, and other disasters and that progressively improve land and soil quality." | Selection of crops according to edaphologic criteria. Installation of soil and water sensors | Environmental | 2 |
| 2.5 | "At the end of 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed." | Collaboration with "the Agronomy Research and Education Center of Cantabria (CIFA)" to adapt and cultivate suitable seeds to farmland | Institutional | 1 |

**Table 3.** *Cont.*

| #.# SDG Target Description | | Action Proposed by Panelists | Dimension | RDP Priority |
|---|---|---|---|---|
| 4.4 | "By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs, and entrepreneurship." | Internships of students from the training center "La Granja de Heras" in farming activities | Institutional | 4 |
| 4.7 | "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development." | Sustainability, social inclusiveness, and local identity are the flagship of the plan | Social | 6 |
| 4.B | "At the end of 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States, and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering, and scientific programs, in developed countries and other developing countries." | Inclusion of a scholarship program to promote education and training for cooperative members and their descendants | Social | 4 |
| 5.5 | "Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life." | As full cooperative members, women participate in all levels of decision-making process | Social | 6 |
| 5.C | "Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels." | Elimination of gender gap as stipulated in statutes of the cooperative | Social | 6 |
| 6.3 | "By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally" | Farming activities are focused on ecological and organic products | Environmental | 2 |
| 6.4 | "By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity." | Drip irrigation and water sensors to increase water-use efficiency | Environmental | 2 |
| 6.B | "Support and strengthen the participation of local communities in improving water and sanitation management." | Natural resource efficiency as a cornerstone of the cooperative | Environmental | 5 |
| 7.2 | "By 2030, increase substantially via the share of renewable energy in the global energy mix." | Preferential use of biomass and photovoltaic panels as source of renewable energy | Environmental | 2 |

**Table 3.** *Cont.*

| #.# SDG Target Description | | Action Proposed by Panelists | Dimension | RDP Priority |
|---|---|---|---|---|
| 7.3 | "By 2030, double the global rate of improvement in energy efficiency." | Implementation of productive processes oriented to promote energy efficiency | Environmental | 2 |
| 8.2 | "Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors." | Diversification is based on exclusive local crops, high-quality products and a unique poultry slaughter plant in CantabriaFood processing promotes vertical integration | Economic | 2 |
| 8.3 | "Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity, and innovation and encourage the formalization and growth of micro-, small-, and medium-sized enterprises, including through access to financial services." | Cooperative as the model used to manage the revitalization plan | Social | 6 |
| 8.4 | "Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programs on sustainable consumption and production, with developed countries taking the lead." | Application of responsible consumption and production practices in farming | Environmental | 2 |
| 8.5 | "By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value." | As a main principle of cooperative associations | Social | 6 |
| 8.6 | "At the end of 2020, substantially reduce the proportion of youth not in employment, education, or training." | Creation of a school-workshop targeted at unemployed people | Institutional | 4 |
| | | Participation of students from the training center "La Granja de Heras" in professional practices associated to farming activities | | |
| 8.8 | "Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment." | Up to a maximum of 50% of cooperative members are migrants and/or belong to vulnerable groups such as abused women or refugees at risk of social exclusion | Social | 6 |

**Table 3.** *Cont.*

| #.# SDG Target Description | | Action Proposed by Panelists | Dimension | RDP Priority |
|---|---|---|---|---|
| 8.9 | "By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products." | "Roman road of Besaya" to attract visitors | Economic | 6 |
| | | Tourism based on agriculture | | |
| | | Local products and gastronomy as core business | | |
| 9.5 | "Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending." | "The Agronomy Research and Education Center of Cantabria (CIFA)" contributes to enhance scientific research | Institutional | 1 |
| 9.B | "Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities." | Promotion of knowledge and technology transfer from the two regional universities and research centers to improve farming activities | Institutional | 1 |
| 9.C | "Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020." | Development of a smart management network that foster distance learning, remote elderly health care and services for dependent person E-commerce initiative "from stable to table" | Social | 6 |
| 10.2 | "By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion, or economic or other status." | At least 50% of cooperative members are migrants and/or belong to vulnerable groups such as abused women or refugees | Social | 6 |
| 10.4 | "Adopt policies, especially fiscal, wage, and social protection policies, and progressively achieve greater equality." | Work-life balance measures such as part-time jobs, grants for parents for childcare, children facilities | Social | 6 |
| 11.3 | "By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlement planning and management in all countries." | Cooperative contributes to inclusiveness and social engagementA yearly multicultural festival serves to showcase customs and traditions from home countries of new foreign inhabitants | Social | 6 |

**Table 3.** *Cont.*

| #.# SDG Target Description | | Action Proposed by Panelists | Dimension | RDP Priority |
|---|---|---|---|---|
| 11.4 | "Strengthen efforts to protect and safeguard the world's cultural and natural heritage." | Participation of local residents in the school-workshop to protect cultural heritageAlternative tourism grounded on natural heritage | Social | 4 |
| 12.2 | "By 2030, achieve the sustainable management and efficient use of natural resources." | Application of responsible consumption and production practices | Environmental | 5 |
| 12.4 | "At the end of 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water, and soil in order to minimize their adverse impacts on human health and the environment." | Selection of organic and ecological crops that reduce land use and air pollution | Environmental | 2 |
| 12.5 | "By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse." | "Zero waste" policy. Most waste is expected to be used as biomass fuel | Environmental | 2 |
| 12.6 | "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle." | Sustainability report is part of the annual report issued by the cooperative | Social | Not applicable |
| 12.8 | "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature." | Certifications and trademarks that associate products to sustainable attributes and organic practices | Economic | 2 |
| | | Patronage of farm productionRental of allotments to urban residents to share rural lifestyle | | |
| 12.A | "Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production." | Circular economy principles towards zero waste bases the rural strategy. Waste is planned to be used as biomass fuel. | Economic | 2 |
| 12.B | "Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products." | Sustainability report is part of the annual report issued by the cooperative | Social | Not applicable |
| 13.2 | "Integrate climate change measures into national policies, strategies, and planning." | The balance of carbon is planned by the use of renewable energy | Environmental | 2 |

**Table 3.** *Cont.*

| #.# SDG Target Description | | Action Proposed by Panelists | Dimension | RDP Priority |
|---|---|---|---|---|
| 15.1 | "At the end of 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains, and drylands, in line with obligations under international agreements." | The renewal of ecosystems damaged by human activity, the search of the maximum biological balance in the natural environment and a management based on soil requirements | Environmental | 5 |
| 15.2 | "At the end of 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests, and substantially increase afforestation and reforestation globally." | As forests are the larger provider of biomass fuel, sustainable management and restoration were deemed in the rural plan | Environmental | 5 |
| 15.3 | "By 2030, combat desertification; restore degraded land and soil, including land affected by desertification, drought, and floods; and strive to achieve a land-degradation-neutral world." | Ecological farming activities to avoid land degradation Slope of land lower than 3% for agricultural purposes. | Environmental | 5 |
| 16.7 | "Ensure responsive, inclusive, participatory, and representative decision making at all levels." | Cooperative guarantee total equality between all its members | Social | 6 |
| 17.17 | "Encourage and promote effective public, public–private, and civil society partnerships, building on the experience and resourcing strategies of partnerships." | A community work plan is agreed with local authorities to employ temporary underutilized staff by enhancing ornamentation of villagesLong-term land leases to increase size of plots and avoid land consolidation | Institutional | 6 |

The sustainable plan to revitalize Pesquera-San Miguel de Aguayo intends to employ a number between 30 and 50 household heads aged 25–40 to increase and consolidate the population of both villages through the move of entire families in a maximum of three years. Preferential workforce comes from immigrant and vulnerable groups. Previous experience in farming tasks is sought among immigrants to conduct key productive activities. The incorporation of persons from vulnerable and disadvantaged collectives wants to provide an opportunity to people at risk of exclusion in a new location. The full inclusion of women in the workplace is expected when productive activities are consolidated. Ecological agriculture based on exclusive products, organic poultry and egg production, food processing, agro-tourism, and electronic commerce (e-commerce) focused on healthy customers summarize key productive activities included in the action plan. Subsidization is discarded to minimize dependence on public institutions. Three milestones were set in the adopted schedule of the action plan at three, five, and 10 years. Operation start-up is forecasted over the third year; meanwhile, refurbishment of dwellings for newcomers, agricultural land preparation, construction of facilities, and bureaucratic formalities are undertaken. At that time, the formation of cooperatives is completed

to manage businesses. First profits are envisaged during the fifth year and funding reimbursement should be completed at the end of the 10th year.[3]

The future of rural areas is grounded on a diverse economy that responds to a shifting demand, local entrepreneurship, an increase of agricultural productivity, and a decreasing weight of farming sector in the overall economy [61]. Consequently, the proposed strategy combines agricultural production and alternative tourism based on farming tasks, local gastronomy, and cultural heritage. Whilst the former is a labor-intensive sector with the capacity to create jobs [62], the latter can be deemed as a bond with other regions [63] and a means of promoting further economic activities [64]. National economic growth, price fluctuations, disposable income of consumers, and unemployment rates are main economic factors that can have a direct or indirect impact on demand or the prices of products and services. The plan of rural revitalization was designed to employ staff in a flexible and gradual manner in any of the selected economic activities, which enables to face a decline of demand due to economic deterioration and lower levels of disposable income. Temporary underutilized workforce is assigned to a community work plan that was agreed with the local authorities as a compensation for the support received in the operation of the action plan. This scheme is meant to improve ornamentation of villages in order to attract more tourists and provide visitors a high-quality experience [65]. The replication of the model conceived for Pesquera and San Miguel de Aguayo in other locations is foreseen in case of a massive market demand by adapting economic activities to the new geographical context and orography.

Direct selling is encouraged through an e-commerce initiative called "from stable to table" that allows users to monitor price fluctuations and determine adjusted prices of sale according to disposable income of consumers and demand and reduce intermediation expenses and market product surpluses. The absence of intermediaries is one of the greatest advantages of direct marketing fostered by the use of internet and e-commerce technologies that enables to bring farm goods and hospitality services to customers. Furthermore, the choice of ecological and organic products is made on the basis of variety, high quality, and affordability in order to build customer loyalty. Edaphologic studies of soils in Pesquera-San Miguel de Aguayo are necessary to identify the most productive crops.

An everlasting social fabric is a fundamental aspect to ensure the success of any rural reactivation plan that involves people outside the villages to overcome demographic challenges. A strong social capital contributes to inclusiveness and public participation in rural areas [66], whilst collaboration between different actors and sectors is strengthened [67]. In this sense, the action plan envisaged for Pesquera-San Miguel de Aguayo proposes a cooperative system as an example of social innovation that seeks the achievement of societal goals through the development of new social relations [68,69] and the empowerment of rural areas [70]. Cooperatives provide an adaptive governance approach [71] that contains diversity of values and interests, promotes the resolution of conflicts [72], and builds a community spirit [73] and sense of belonging and identity [74]. Cooperatives also serve to facilitate the access of women to employment on an equal footing with men.

One of the main purposes of the rural strategy is the consolidation of a stable population in the selected areas through the settlement of young families whose parents aged 25 to 40 with a twofold objective. First, birth statistics can significantly be improved due to the growth of the number of fertile women from the current 29 to the expected 59/79 females. Second, ageing rate can be also reduced from 29.30% up to 20.00% and consequently, working people might rise over 74% when the plan is concluded. Compatibility of family and career is also an important social concern, especially for women who seek to join the labor market, which is the reason why the action plan includes grants and part-time jobs for parents who are taking care of children. A balance between the number of newcomers and local residents is pretended to avoid social tensions. As the integration of newcomers and recognition of diversity and multiculturalism are major challenges to be addressed, a yearly multicultural festival is

[3] Schedule is founded on a business plan that contains diverse scenarios and different economic activities.

planned to showcase customs and traditions from home countries of new foreign inhabitants, boost the involvement of local people [75], and attract visitors.

Technological factors can affect positively on productive activities and market by gaining competitive advantage, increasing productivity, improving management, and developing new businesses [76]. Technological awareness, smart management, e-commerce, level of innovation and research, and development activities are also present in the rural revitalization plan. Traditional farming in Cantabria is historically associated to bovine livestock and subsistence agriculture in which peasants grow food crops to meet the needs of themselves and their families [77] and sometimes participate in trade [78]. Current farmers therefore show a dearth of technological awareness in connection with the availability, applicability, and limitation of high-efficiency production systems [79]. Hydroponics, modern greenhouse practices, vertical farms, soil and water sensors, and digitalization are some of technological innovations considered. Besides, agreements with the two regional universities, the "Agronomy Research and Education Center of Cantabria (CIFA)" and the training center "La Granja de Heras" are the means of providing qualified staff and guaranteeing knowledge transfer to incorporate outcomes from scientific research and development into economic activities. As the action plan seeks the creation of a high-value market niche, consumer awareness and recognition to generate demand [80,81] could be stimulated through the use of certifications and trademarks that add value to products [82]. The creation of a trademark linked to the revitalization project is pretended by associating products to some sustainable attributes [83] inter alia, organic practices, local identity, environmental care [84], circular economy, or social inclusiveness [85]. Alternative activities such as organic poultry and egg production, food processing, and agro-tourism give stability to the rural development [86] of Pesquera-San Miguel de Aguayo as part of the diversification strategy that builds a new local economy [87]. For instance, the construction of a poultry slaughter plant is planned to alleviate the lack of such a facility in Cantabria.

Despite information communication and technology still being deficient in the countryside [88], it is expected to create a smart management network that fosters the social and economic wellbeing of residents [89] in each rural node by strengthening their linkages inside and outside of the region as an engine of growth [90]. Distance learning, remote elderly healthcare, and services for dependent persons can be applied to the social sphere, whilst e-commerce, tourism marketing, and local business outreach can enhance local competitiveness [91].

The scarcity of raw materials, growing pollution, and carbon footprint have mainly prompted the consideration of environmental factors on economic activities, and for that reason, responsible consumption and production, circular economy principles, attitudes toward green products, energy efficiency, and renewable energies were covered by the suggested action plan. Farming activities meet the principles of sustainable and organic agriculture through the responsible use of natural resources that mitigates negative environmental impacts and boosts the renewal of ecosystems damaged by human activity, the search of a biological balance in the natural environment, and management based on soil requirements [92]. The whole action plan was envisioned through the implementation of circular economy practices that preserve the value and energy of resources by means of a "zero waste" strategy based on designing out waste and pollution, keeping products and materials in use, and regenerating natural systems [93]. Economic activities were thus designed to reduce energy consumption, improve energy efficiency, and offset carbon emissions. Photovoltaic panels are provided for building roofs, whilst organic debris from agriculture and forests are planned to be used as biomass fuel. Two additional initiatives were also included in the plan to bring together producers and consumers. The rental of allotments to urban residents can foster knowledge of the rural world and farming tasks, so long as tenants can benefit from fresh products. Moreover, a sponsorship program enables people to help fund crops in exchange of natural seasonal products.

Since land capability defines the ability of a plot to sustainably support a specific land use without degradation, environmental laws are needed to protect the capacity of every land component to provide ecosystem services. Land capacity thereby promotes high standard farmland, sustainable

land use, and agricultural security [94]. The reform of land tenure laws was suggested by Du and Huang [95] to stimulate rural revitalization, whilst land consolidation was defined as an effective tool to achieve multiple objectives in rural projects [96,97] and facilitate the restructuring of rural production [98]. Land consolidation aims to reduce land fragmentation [99] by transforming small and scattered plots into new plots of greater size [100]. Consolidation also means the improvement of accessibility to cultivated land, as well as a new regulation of water regime [101] and sometimes land use transformation [102]. Because farmers and rural collective groups play a key role in land consolidation, rural governance systems and governance capacity should also evolve [103]. That is one of the main reasons for constituting cooperatives as the preferred management system. On the other hand, an improper land consolidation process can lead to potential ecological risks associated to biodiversity [104], ecosystem services [105], and soil properties [106]. The reluctance expressed by most of local panelists to land consolidation led to long-term leases as a further option to increase the size of productive plots.

### *3.3. Interlinkage between the Proposed Initiative and the SDGs and the RDP*

The principles of sustainable development were adopted as a main reference to design the strategy to revitalize Pesquera and San Miguel de Aguayo. At the beginning of the participatory process, the panelists selected 10 SDGs as the most relevant to be considered, namely SDG8, SDG12, SDG13, SDG9, SDG4, SDG7, SDG15, SDG5, SDG11, and SDG6 in preference order. The rural plan comprises 52 actions (Table 3) that represent 40 out of the 169 SDG targets of the 2030 Agenda. As shown in Figure 11, the highest number of involved SDG targets (7) corresponded to SDG8 and SDG12. On the other hand, no action was associated to SDG1, SDG3 and SDG14. SDG2, SDG4, SDG5, SDG6, SDG7, SDG9, SDG10, SDG11, and SDG15 each encompassed two or three actions, whilst SDG13, SDG 16, and SDG17 were only covered by one initiative. There is thus consistency between the preferred SDGs shortlisted in the first consultation round and those associated to the final strategy. Furthermore, social, economic, environmental and institutional dimensions were all contained in the revitalization plan. Social issues were connected to most actions (17), followed by environmental (16) and Economic (11) aspects. The institutional dimension was related to eight actions.

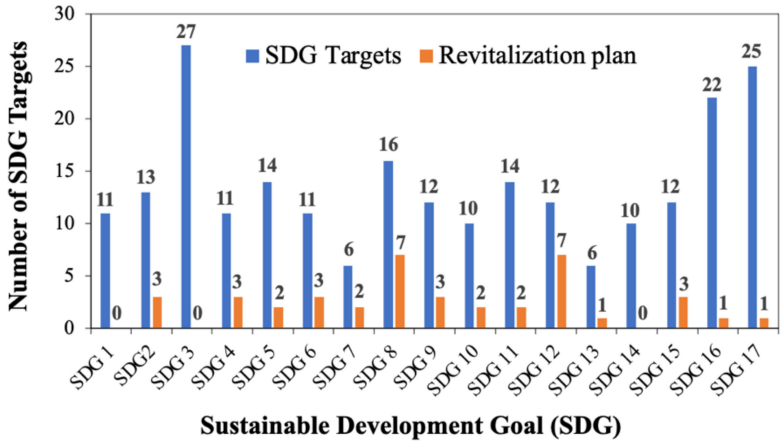



**Figure 11.** Distribution of the SDG targets covered by the proposed rural strategy.

Despite the participants elected Priorities 6, 4, 2, and 1 of the EU Rural Development Programme as paramount in the first consultation round, Priority 5 was also included in the plan with six initiatives. The distribution of the proposed actions by RDP priorities determined that Priority 6: Promoting social inclusion, poverty reduction, and economic development and Priority 2: Enhancing the viability and competitiveness of all types of agriculture were the most appreciated with 18 and 17 actions, respectively. Meanwhile, Priority 4: Increase the number of young and adults who have relevant

skills and Priority 1: Fostering knowledge transfer and innovation in agriculture only gathered 6 and 3 proposals. Priority 3: Promoting food chain organization was not regarded in the suggested strategy.

The Rural Development Programme for Cantabria is founded on four RDP priorities—namely, Priority 2, Priority 3, Priority 4, and Priority 6. Unlike the above action plan, the RDPC attaches greater significance to promoting food chain organization ("Priority 3") than fostering knowledge transfer and innovation in agriculture ("Priority 1"). Moreover, 10 broad guidelines were mostly prescribed to invest in physical assets and forests, develop agricultural activities, provide basic services, preserve the environment, and promote organic farming, animal welfare, cooperation, and local development. As the socioeconomical characterization of the region was not examined in the program, no specific measures were depicted for municipalities or counties. The SWOT analysis of the RDPC emphasizes demographic issues as the low number of women and young people in the rural realm, as well as scarce training and knowledge transfer that result in low productivity and technological level. Exploitation of biomass and renewable sources of energy, cooperative associations, integration of food production and processing, agro-ecological farming, development of own marketing channels, and use of ICT were listed as some opportunities for the countryside of Cantabria. In this vein, the research accordingly provides a new frame of reference that outlines concrete actions to apply in the selected rural areas based on social participation as a valuable complement to the RDPC.

## 4. Conclusions

The inexorable population exodus to cities and the ensuing economic decline in rural areas have triggered the emergence of multiple rural development strategies and projects driven by public institutions that barely consider social engagement and integration of sustainable development goals together. With the purpose of bridging this gap, this research combined a participatory process and the application of the SDGs to define a feasible strategy to help to revitalize a depopulated rural area of the Spanish region of Cantabria as an example of the problems that affect the countryside in the European Union. The main conclusions drawn from this study are summarized as follows:

- Social dimension was revealed as instrumental in the design of the action plan. Most panelists expressed concern regarding inclusiveness, newcomer retention, gender equality, and work–family balance as cornerstones for the success of the rural strategy.
- Economic activities proposed represent a break with traditional farming practices. The pronounced regional orientation toward bovine livestock gave way to organic agriculture, poultry production supported by the construction of a poultry slaughter plant, and food processing.
- The lack of knowledge about the SDGs and the close interlinkage between those goals altered the methodology initially planned so that each working group should have been mainly focused on the assigned SDGs related to one of the sustainability facets. Instead, the four sustainability dimensions were analyzed by all teams.
- Although smallholding is widely practiced in Cantabria, most participants suggested cooperatives as the preferred governance system to inter alia increase land productivity, resolve disputes, promote resource efficiency, improve equal opportunities, and build a sense of belonging and identity. Land consolidation was widely rejected by the panelists.
- Apart from a range of general remarks included in the SWOT analysis, the contribution of the Rural Development Programme for Cantabria to the research was scant. The present study provides valuable insights from multi-sectoral stakeholders that can be put into practice to revitalize the countryside areas of the region.

The non-involvement of local and regional authorities can be judged as a constraint, but the study deliberately sought social participation through the interaction between thematic groups to examine all sustainability dimensions. The dearth of funding limited the identification and selection of suitable farmlands and productive crops to determine more accurately economic activities and impacts. As the highly general character of the 2030 Agenda hindered a precise correlation between the planned

rural actions and the SDGs, further research is expected to tailor SDG targets and indicators to a new framework to be used in the revitalization of rural areas.

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## Appendix A

**Table A1.** The six priorities of the Rural Development Policy in the EU [24].

| Priority# | Description |
|---|---|
| 1 | "Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas." |
| 2 | "Enhancing the viability and competitiveness of all types of agriculture and promoting innovative farm technologies and sustainable forest management." |
| 3 | "Promoting food chain organization, animal welfare, and risk management in agriculture." |
| 4 | "By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs, and entrepreneurship." |
| 5 | "Restoring, preserving and enhancing ecosystems related to agriculture and forestry" |
| 6 | "Promoting social inclusion, poverty reduction, and economic development in rural areas." |

**Table A2.** Evaluation of actions suggested by panelists in the survey of round 2.

| Action# | Dimension | Description | Score | SDG# |
|---|---|---|---|---|
| 1 | Economic | Crop selection to increase land productivity | 193 | 2, 12 |
| 2 | Economic | Adaptation of agricultural production to demand | 174 | 8 |
| 3 | Economic | Livestock exclusion | 118 | 8 |
| 4 | Economic | Diversification of farming activities | 162 | 8 |
| 5 | Economic | Alternatives to traditional rural tourism | 95 | 8, 12 |
| 6 | Economic | Online commerce | 183 | 9 |
| 7 | Economic | Registration of protected denominations of origin | 5 | 12, |
| 8 | Economic | External funding rather than public subsidization | 138 | 2, 9, 17 |
| 9 | Environmental | Crop rotation | 201 | 2, 15 |
| 10 | Environmental | Use of genetically modified crops | 0 | 2, 8 |
| 11 | Environmental | Use of biomass from forests | 167 | 7, 15 |
| 12 | Environmental | Preservation and restoration of forests to supply biomass fuel | 75 | 7 |
| 13 | Environmental | Implementation of sustainability metrics and reports | 11 | 12 |
| 14 | Environmental | Carbon neutral objective | 103 | 13 |
| 15 | Environmental | Zero waste policy | 81 | 12 |
| 16 | Institutional | Creation of a commonwealth of services | 17 | 17 |
| 17 | Institutional | Land consolidation process | 64 | 17 |
| 18 | Institutional | Incorporation of local and regional authorities only when the action plan is fully defined by panelists | 158 | 17 |
| 19 | Social | Collaboration with regional Agronomy Research and Education Centers | 201 | 8, 12 |
| 20 | Social | Incorporation of rural inhabitants into professional training, as well as education of young people to preserve local customs and traditions | 165 | 4, 11 |
| 21 | Social | Cooperativism as instrument of business management | 128 | 8 |
| 22 | Social | Initiatives to promote rural culture | 47 | 12 |
| 23 | Social | Regular events to divulge cultures of newcomers | 91 | 4 |
| 24 | Social | Reconciliation of family life and work | 141 | 5 |
| 25 | Social | High-quality internet access | 27 | 4, 17 |

**Table A3.** Social issues addressed in the questionnaire of the second round.

| Question# | Description |
|---|---|
| 1 | Do you believe that residents in your village would accept people from other cultures to live there? |
| 2 | Percentage of foreigner population that could enable a peaceful cohabitation in your village |
| 3 | Number of people that could be housed in your village according the availability of housing or land to build |
| 4 | Do you agree on including people from vulnerable groups (abused women, refugees, etc.) in your village? |
| 5 | Would you participate in a Land Consolidation process to foster economic activities in your village? |
| 6 | Are you willing to be a cooperative member? |

**Table A4.** Measures to promote settlement of young families.

| Item# | Description |
|---|---|
| 1 | Loyalty rewards for staying at villages (housing, land) |
| 2 | Incorporation of women-mothers into labor market |
| 3 | Scholarships for students |
| 4 | Childcare facilities |
| 5 | Timeframe to help newcomers settle in villages |

**Table A5.** Baseline to define specific actions in round 3.

| Description |
|---|
| Crop selection |
| Adaptation of agricultural production to demand |
| Poultry production |
| Use of farming production in food processing industry |
| Agro-tourism initiatives |
| Online commerce |
| External funding |
| Crop rotation |
| Use of biomass as a source of energy |
| Preservation and restoration of forests to supply biomass fuel |
| Carbon neutral objective |
| Zero waste policy |
| Long-term land leases to avoid a land consolidation process |
| Incorporation of local and regional authorities only when the action plan is fully defined by panelists |
| Collaboration with regional Agronomy Research and Education Centers |
| Incorporation of rural inhabitants into professional training, as well as education of young people to preserve local customs and traditions |
| Adoption of cooperativism as instrument of business management |
| Initiatives to promote rural culture |
| Regular events to divulge cultures of newcomers |
| Reconciliation of family life and work |

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