

ADVANCES IN FOREST FIRE RESEARCH

2022

Edited by

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Mitigating rural fires through transformative service research: value cocreation with forest-related rural communities

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Keywords

Rural fires, transformative service research, value cocreation, wellbeing

Abstract

Socioeconomic changes have caused profound transformations in forest landscapes and increased abandonment of rural areas, leading to fuel accumulation and higher landscape homogeneity, and consequently, raising the rural fires risk. Rural fires risk is also fueled by climate change, due to heat waves and lack of precipitation. In this context, rural communities inhabiting forest areas are those who suffer the most, because rural fires, land degradation and climate change can disturb their food and economic strategy. These communities already suffer from underdeveloped rural infrastructure, and services, lack of labor and education opportunities, that trigger poverty and migration. Given this accelerating pace of change and increasing uncertainty, many fields of knowledge have been dedicated to contributing towards a more sustainable and inclusive future. In service research, transformative service research (TSR) literature plays a central role on understanding problems and finding solutions that improve well-being and create uplifting change through services. Similarly, the fire research field highlights the need for an integrated perspective to analyze all the aspects involved in rural fires occurrence, whether they are of an environmental or economic nature, or a sociological or demographic nature.

This study aims to explore transformative services oriented to cocreate value with forest-related rural communities, thus helping to manage forest areas and mitigate rural fires risks. A qualitative methodology was employed involving 28 participants related to fire management and forest areas and communities, including actors from industries, public entities, academics, the third sector. The data collected through individual interviews was transcribed, coded, and analyzed following a thematic analysis approach, with NVivo software support.

Overall, the study emphasizes the need for an endogenous and adapted set of services to cocreate value with vulnerable communities in forest areas, which consequently enable rural fires mitigation. Given the high level of land abandonment and accumulation of residual materials that increases the risk of rural fires, the development of valuing and recovery solutions is a priority. Finally, this research can also help decision-makers and stakeholders to generate and support services that cocreate value with rural communities to a sustainable, safe and inclusive future.

1. Introduction

Socioeconomic changes have caused profound transformations in forest landscapes and increased abandonment of rural areas since the 19th century. Land abandonment led to fuel accumulation and higher landscape homogeneity, and both contribute to raised rural fires risk (Mantero et al. 2020); also fueled by climate change, due to heat waves and lack of precipitation (Nunes et al. 2021). In this context, rural communities inhabiting forest areas are those who suffer the most, since they are especially vulnerable to land degradation and climate change (Shukla et al. 2019), which can disturb their food and economic strategy, exposing them to new social vulnerabilities and inequities (Miller and Mach 2022). These communities also suffer from the underdeveloped rural infrastructure, and services, lack of labor and education opportunities, that trigger poverty and migration (Lazarte 2017). So, increasing the land abandonment and rural fires risk, in a cyclical transformation of an ecosystem in increasingly poor health.

Given this accelerating pace of change and increasing uncertainty, many fields of knowledge have been dedicated to contributing towards a more sustainable and inclusive future. In service research, transformative

service research (TSR) literature plays a central role on understanding problems and finding solutions that improve well-being and create uplifting change through services (Anderson et al. 2013; Ostrom et al. 2021) in an inclusive way (Boenigk et al. 2021). Addressing how different stakeholders can share resources to achieve common goals (Ostrom et al., 2021) and how sustainability efforts require the active involvement of stakeholders throughout the service ecosystem (Field et al. 2021). Similarly, forest fire research field highlights the need for an integrated perspective to analyze all the aspects involved in rural fires occurrence, whether they are of an environmental or economic nature, or a sociological or demographic nature (Nunes et al. 2021). The increased risk of rural fires, due accumulation of biomass fuels in forests, motivated the launch of a set of legislative measures that seek to promote the management, cleaning, and control of these species. At the same time, it stimulates the study and research for more efficient and viable recovery alternatives, which allow the creation of value for these residual materials and the promotion of their sustainable management, thus mitigating the risk of rural fires. An example of this is the energy recovery of these species in local, small-scale processes, that is, increasing the value through planned actions (Nunes et al. 2021)

Considering the challenges presented, this article is bridging the service research field, namely, transformative service research (TSR) literature, with the forest fire research, through endogenous and adapted services that cocreate value with forest-related rural communities, mitigating rural fires risks. These services can foster value cocreation with the endogenous forest resources for commercial and non-commercial purposes, such as exploitation of natural resources (timber, pine resin, mushrooms, bee hives, etc), human nutrition, cultural and experience services. It can potentially contribute to the generation of jobs and income in rural areas (Weiss et al. 2020), as well as create more efficient and viable recovery alternatives for residual materials and promote their sustainable management, thus mitigating the risk of rural fires (Nunes et al. 2021). Thus, transformative services do not directly lead to well-being but serve as a mediating construct to promote greater well-being among individuals and collectives (Blocker and Barrios 2015).

Based on TSR approach in the improvement of individuals and ecosystems well-being and create uplifting change through services, this research aims to explore services to cocreate value with forest-related rural communities to mitigate rural fires risks. The following sections describe the method employed to answer this objective, as well as characterize main findings, discussion, and conclusions of this study.

2. Method

A qualitative methodology was undertaken to gain an in-depth understanding of how transformative service research can contribute to mitigating rural fires risks and increasing the well-being forest-related rural communities, through services. To ensure the holistic perspective of the research topic, 28 stakeholders with in-depth involvement and experience in Portugal forest-related areas and communities, and fire management, were individually interviewed. The sample included representatives from industries, public entities, academics, the third sector, from National Military Security Force, Volunteer Firefighters, National Emergency and Civil Protection Authority, National Guard, Agency for the Integrated Management of Rural Fires; National Institute for the Management and Conservation of Nature and Forests, forestry companies, electricity, and natural gas transport industries, multinationals that operate in telecommunications and other industries, associations, universities.

The data collected was transcribed, coded, and analyzed following a thematic analysis approach, with NVivo software support. Data analysis followed the Gioia approach (Gioia, Corley, and Hamilton 2013). Firstly, the interviews were initially coded following open coding procedures, in first-order codes, where the concepts were initially identified, and the properties and dimensions of these concepts were discovered in the data.

Afterwards, the codes were grouped, with continuous analysis of their subcategories, allowing the emergence of preliminary themes (second-order codes). These set of concepts were refined into “aggregate dimension”, that we named services to cocreate value with rural communities and mitigate rural fire risk, described in the following section.

3. Findings

From the data analysis a set of adapted services were identified with potential features to cocreate transformative value with rural communities and mitigate rural fires risk (Figure 1), such as associative and collaborative

services, ecosystem services remuneration, mentoring for smart use of land and management of its resources, rural industries and training and education services, as well as rural marketing and advertisement. Each identified service according to the stakeholders perspective will be reported in the following paragraphs.

Associative and collaborative services describe the collaborative effort to develop and protect local interests to overcome challenges of territory fragmentation, land abandonment, lack of land management and cleaning that increase the rural fires risk.

Ecosystem services remuneration consist of the landowner continually payment in exchange for guaranteeing the flow of ecosystem services, which is provided by nature and essential to survival, quality of life and well-being of society. These payments for ecosystem services can have different objectives and characteristics (e.g. payment for conservation, for active management of the landscape) and may favor a specific service (e.g. carbon sequestration), or a set of services provided by ecosystems (e.g. fertility of the soil, erosion control, hydrological regulation).

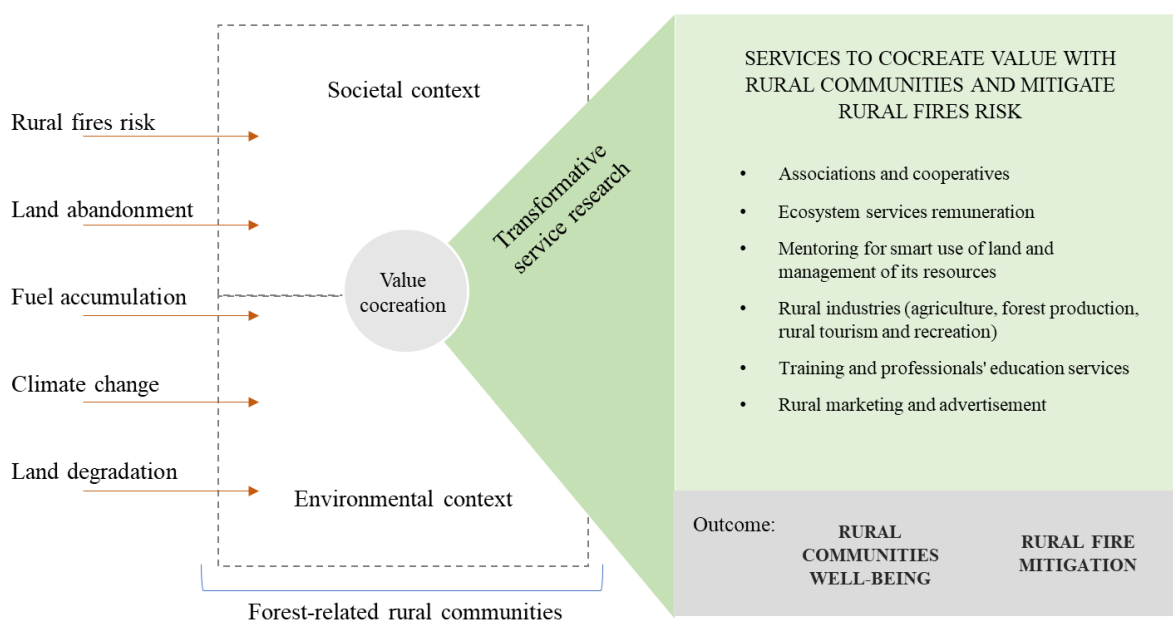


Figure 1- Services to cocreate value with rural communities and mitigate rural fires risk

Mentoring for smart use of land and management of its resources includes services oriented to active landscape management, sustainable manners to manage and promote the land and the resources, such as valuing residual biomass to energy recovery in local or small-scale processes, or recovery alternatives for residual materials. Rural industries encompass industries that run in rural areas, based on the utilization of local available resources, including agriculture, forest production, rural tourism and recreation.

Training and education services describe services to leverage knowledge in technical training in sustainable management of the land (suitable plant species to specific areas, valorization of natural materials, agrosilvopastoral system), and the professionalization of technicians in the forest clearing and safe fire use. These training and education services could be planned according to forest-related rural communities' profiles, such as local residents or technicians. And if oriented to young people, it can also contribute to attract them to rural areas. Lastly, rural marketing and advertisement services refers to foster and generate new social and economic dynamics to rural development through advertisement.

4. Discussion and conclusion

Rural communities' well-being in forest areas is linked to the recognition of the value of resources and the active and significant contribution of these territories to the mitigation of current challenges, such as rural fires (Nunes et al. 2021), land abandonment (Mantero et al. 2020), climate change (Nunes et al. 2021; Shukla et al. 2019), land degradation (Shukla et al. 2019) - that cannot be done without caring for the well-being of forest-related

rural communities. In other words, society needs rural areas and communities and the enhancement of the resources to face current global social and environmental challenges.

Moreover, the study demonstrates how transformative service research (TSR) favored forest fire research avenue, namely, to fire risk management with rural fires prevention, through a set of adapted services oriented to cocreate value with forest-related rural communities.

These services can improve the wellbeing of rural communities and, at the same time, foster active fuel management, promote the local economy and engagement of the community. Thus, mentioned services can foster value cocreation with the endogenous forest resources for commercial and non-commercial purposes (Weiss et al. 2020), contributing to sustainable land management and resources promotion, such as the possibility of valuing residual biomass (Nunes et al. 2021), generating new social and economic dynamics to rural development, such as jobs opportunities, income to local markets, and so avoiding land abandonment and encouraging the active land management. In a broader perspective, transformative services oriented to value cocreation with forest-related rural communities can also contribute substantially to poverty alleviation and the transition towards low-carbon and green economies. As previously said, transformative services do not directly lead to well-being but serve as a mediating construct to promote greater well-being among individuals and collectives (Blocker and Barrios 2015).

This study introduces an alternative lens to address the rural fires issue with a call for endogenous and adapted services oriented to value cocreation with vulnerable communities in forest areas. Given the high level of land abandonment and accumulation of residual materials that increase the risk of rural fires, the development of valuing and recovery solutions is a priority. Lastly, this research may inspire decision-makers and stakeholders to foster transformative services for a sustainable, safe, and inclusive future.

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