

AgriVoltaics Acceptability's Challenges

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1. Introduction

Agricultural Photovoltaics, commonly known as agriPV, involves the integration of solar panels into agricultural settings to generate clean energy while maintaining agricultural activities. The concept aims to address the dual objectives of sustainable energy production and land use efficiency.

The agriPV paradigm, has emerged as a transformative approach with immense technical potential. The EU's expansive Utilized Agricultural Area (UAA), spanning nearly 158 million hectares, presents an opportunity for Agri-PV systems to leverage diverse land categories, including arable land, permanent grassland, meadow, permanent crops, and market gardens. For instance, covering just 10% of arable land and permanent grassland could yield installed capacities ranging between 3.2 and 14.2 TW, aligning closely with the EU's Fit-for-55 objective to reduce greenhouse gas emissions by at least 55% by 2030 [1].

Building upon existing research [3][5], which has outlined the potential for increased land productivity and economic value under agriPV systems, it is crucial to acknowledge the existing concerns. These concerns span from potential crop harm and competition for land to economic viability challenges. Studies underscore the necessity for comprehensive sustainability assessments before the widespread adoption of agriPV systems. This acknowledgment sets the stage for further research into the multifaceted dimensions of agriPV, delving into social acceptance aspects that have been hitherto less explored. While existing studies provide insights into the technical and economic facets, the social dimension remains a critical gap. This research aims to bridge that gap by exploring farmers' perceptions, potential conflicts arising from agriPV adoption, and safety concerns.

Navigating these social acceptance issues requires a balanced approach that considers the economic, environmental, and social dimensions of agriPV projects. Engaging with stakeholders, providing education on the co-benefits, and addressing community concerns are crucial steps in fostering greater acceptance of agriPV solutions. By addressing these social acceptance dimensions, the study aims to contribute to informed decision-making, ensuring the harmonious integration of agriPV systems into the agricultural landscape.

2. Challenges in Social Acceptance

The successful implementation of agriPV, the integration of photovoltaic (PV) systems into agricultural landscapes, hinges on its social acceptance. Social research is instrumental in unraveling public perceptions, attitudes, and potential barriers to the utility and benefits of agriPV systems. The importance of obtaining a "social license to operate" is underscored, particularly in addressing concerns related to land use and potential conflicts within local communities of farmers and pastoralists [1][2][3].

Understanding the factors influencing farmers' acceptance is crucial. This involves delving into perceived constraints on future farming activities and the perceived risk of declining crop quality under agriPV systems. Farmers' willingness to adopt this technology is intricately linked to how it aligns with their traditional farming practices and the potential impacts on agricultural productivity [4]. Safety concerns of agricultural field workers under agriPV systems are also highlighted, emphasizing the need for comprehensive investigations and the establishment of standard operating procedures to ensure employee welfare. Addressing these concerns is imperative for fostering a positive perception among key stakeholders [1].

It is essential to recognize that the adoption of agriPV is not solely a technical decision but a socio-economic one. Farmers and local communities weigh the potential benefits against perceived risks and uncertainties. Legal ambiguities, changes in land characterization post-agriPV installation, and the possible loss of income contribute to perceptions of insecurity among stakeholders. Increased land prices for areas suitable for agriPV systems in certain regions, such as observed in France, raise economic concerns among farmers, especially new entrants. Farmers' awareness and acceptance are pivotal, necessitating informative outreach efforts and measures to demonstrate favorable economic outcomes and good agricultural practices [1][6].

Harmony between PV electricity generation and maintaining crop yield production demands further research on technical aspects, such as mitigating the impact of partial shading and preserving biodiversity within the surrounding ecosystem [5]. Despite the potential long-term benefits, garnering public appreciation for the overall contribution of agriPV, beyond immediate land use changes, remains essential. Successful social acceptance involves not only addressing concerns but also highlighting the potential positive impacts, such as job creation, enhanced community income, and potential tax revenues. It requires a holistic approach that considers the diverse perspectives of stakeholders involved in the agricultural landscape [4].

3. Conclusion

The integration of agrivoltaics offers substantial potential in addressing energy and agricultural challenges. Despite economic challenges, the dual-use approach presents a multifaceted solution, generating diversified income streams. Social benefits include job creation and enhanced community income, but challenges arise from concerns about altered farmland and economic uncertainties. Environmental outcomes showcase a dual benefit, combining renewable energy with biodiversity support, yet large-scale deployment poses ecological challenges. In conclusion, the social acceptance of agriPV requires continued research, outreach efforts, and comprehensive assessments to ensure its long-term viability and positive impact on society, the economy, and the environment.

4. References

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