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Identifying key pathways in manure and sewage management of dairy farming based on a quantitative typology: A case study in China

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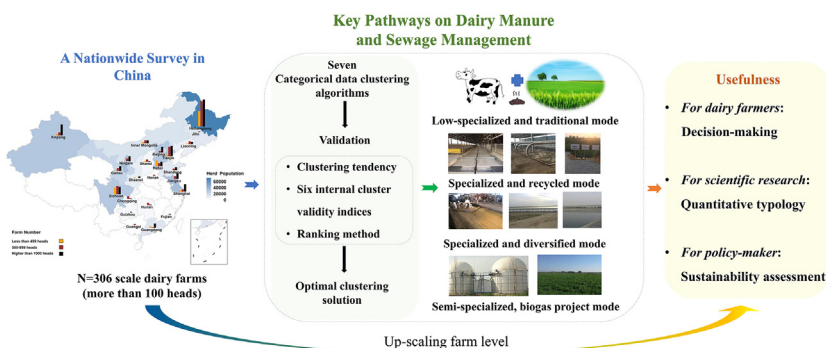
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HIGHLIGHTS

- A robust quantitative typology based on a nationwide survey was realized.
- Four key pathways regarding MSM in China's dairy farming were achieved.
- Key potential influencing factors of farmer's decision-making were identified.
- The pathways benefit higher scale modelling in sustainability & policy assessment.
- Reference values for decision-making of other developing countries were provided.

GRAPHICAL ABSTRACT



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ABSTRACT

With the greatly increased demand for animal products, the global dairy sector has experienced rapid expansion and intensification. The correspondingly increasing manure and sewage produced has been the major contributor to environmental burden and human health, especially in developing countries like China. Both worldwide environmental concerns and growing awareness of the circular economy have focused the governments' attention on environmental policies related to sustainable manure and sewage management (MSM). However, inherently dynamic decision-making processes of individual farms result in a great diversity of MSM practices, which leads to enormous difficulties and complexity in further sustainability and policy evaluation. Hence, it is essential to explore the key MSM pathways to represent diversity at a scientific and statistic view. While it is rarely practiced, particularly in China's dairy farming. We used China as a case study to develop the key MSM pathways using data from the nationwide survey of 306 scale dairy farms via a quantitative typology methodology. The results by optimal clustering solution revealed four key pathways based on the individual practices which are associated with the collection, storage, and processing and utilization stages. Furthermore, general characteristics were compared to identify potential determinant factors. It revealed that the major indicators such as resource endowments, milk productivity and quality, and revenues and expenditure showed a consistently increasing trend among pathways. The results indicated resource availability and intensive degree, to a certain extent, affected the farmers' selection. The possibilities of performing sustainability and policy evaluation at a higher scale were also demonstrated. Overall, the identified key pathways can help to know regional waste utilization

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