

## Information curation in agroecology and territorial development: protocols for the management of digital collections

### Curadoria da informação em agroecologia e desenvolvimento territorial: protocolos para o gerenciamento de acervos digitais

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#### ABSTRACT

With the advancement of digital communication technologies, the need for protocols to establish governance, rules, or procedures in information network relationships arose. The protocols for the management and dissemination of digital collections follow procedures from Information Science, Open Scientific Communication, and Computing. In the context of this work that investigates the formation of an associative network between three universities to execute a

Postgraduate Program in Agroecology and Territorial Development (PPGADT), the previous diagnosis identified decentralized flows for collection, storage, treatment, and dissemination of academic production; growth of online publications; and their dispersion across different storage devices, increasing the risk of loss of institutional memory. From this perspective, this study aimed to review the literature to analyze the current theoretical approaches to support the construction of a knowledge dissemination protocol in the PPGADT network. The conducting method was bibliographical research. The results point to the relevance of knowledge about agroecology and territorial development for the dynamism of the economy, public policies on territorial impact, sustainability, and strengthening of the identity of rural producers. It is concluded that the multi-institutional collections network is one of the strategies for integrating and disseminating networked knowledge in the domain analyzed here.

**Keywords:** information curation, protocol, agroecology, territorial development.

### RESUMO

Com o avanço das tecnologias de comunicações digitais surgiram a necessidade de protocolos para o estabelecimento da governança, regras ou procedimentos no relacionamento em rede de informação. Os protocolos para o gerenciamento e a difusão de acervos digitais seguem procedimentos da Ciência da informação, da Comunicação científica aberta e da Computação. No contexto deste trabalho que investiga a formação de uma rede associativa entre 03 Universidades para executar um Programa Pós-graduação em Agroecologia e Desenvolvimento Territorial (PPGADT), o diagnóstico prévio identificou fluxos descentralizados para coleta, armazenamento, tratamento e difusão da produção acadêmica; crescimento da publicações on-line; e a dispersão delas em diferentes dispositivos de armazenamentos potencializando o risco de perda da memória institucional. Assim, o objetivo do artigo foi fazer uma revisão da literatura para analisar as abordagens teóricas vigentes para subsidiar a construção de um protocolo de difusão do conhecimento na rede PPGADT. O método de condução foi o levantamento bibliográfico. Os resultados apontam a relevância do conhecimento da agroecologia e do desenvolvimento territorial para o dinamismo da economia, as políticas públicas de incidência territorial, a sustentabilidade e o fortalecimento da identidade de produtores(as) rurais. Logo é um importante acervo para o público em geral. Conclui-se que a rede de acervos multi-institucional é uma das estratégias para integração e difusão do conhecimento em rede no domínio aqui analisado.

**Palavras-chave:** curadoria da informação, protocolo, agroecologia, desenvolvimento territorial.

## 1 INTRODUCTION

Brazilian agricultural science stands out in the international scenario with food production, technologies and methods for agroecosystems, and public policies aimed at sustainable development in rural territories. From this perspective, there is a significant demand from society for the consumption of data and information about this area (BERTIN et al., 2017). However, for Pinto & Santos (2015), one of the causes that prevents knowledge and technologies from arriving to farmers is related to the communication of information.

The problem in the diffusion of information and knowledge in the context of agricultural science is not a novelty, but still a relevant question as it demands the refinement of techniques and tools for its management. Bertin *et al.* (2017), in a survey conducted to construct a data management plan, stressed that the 'organization, management, and structuring mechanisms of the company [Embrapa] should be improved' in order to expand data sharing and disclosure. In another study, Santos (2017) highlighted the need for guidelines for the data disclosure applied to the integration of data and knowledge in health to form a collaboration network between institutions to improve health surveillance. However, after surveying the literature, no previous studies were found on the information management policy in agroecology and territorial development produced based on the association of three public universities in northeastern Brazil, aiming at the formation of a digital collections network.

By consulting the regulations of the Postgraduate Program in Agroecology and Territorial Development (PPGADT/UNIVASF/UFRPE/UNEB), Resolution no. 003/2021, which regulates the operating rules among associated universities, only mentions the mandatory need for depositing the thesis and final product at the libraries if each university in order to carry out the PPGADT.

Art. 68. From the date of approval of the Thesis/Final Product by the examining board, the student will have a maximum period of 60 (sixty) days to deliver the copies containing the final version and the product to the PPGADT secretariat and the Central Library of the Associated HEI (Higher Education Institution) to which it has a link; the definitive copies should follow the specific standards created by the Internal College of each Associated HEI, taken in a unified manner to the Coordination Board for analysis, voting and approval by a simple majority at a meeting, counting the members present.

As for data collected in videos, images, or generated by research instruments or computer simulation during research, as well as publications in books, book chapters, journal articles, communications at events, etc., it is not indicated how they will be managed by the PPGADT program. It should be noted that the management of this set of scientific information generates production indicators that serve to evaluate the course, provide management information for decision-making by the coordination, and in attracting funding for new research, if the funding agency requires a data and information management plan for research. Managing academic production prevents the dispersion of information and increases access to contents by the public.

Given the context presented, on the one hand we are faced with decentralized flows for the collection, storage, treatment, retrieval, and dissemination of scientific information; and on the other, the problem of dispersion of information that is possibly archived/stored in different locations.

Considering that these are digital collections produced within the scope of the PPGADT program, the objective of this article was to review the literature to analyze current theoretical approaches on protocol(s) for curating digital information for application in the field of agroecology and territorial development. The protocol will be developed in common agreement with those responsible for managing the PPGADT's digital collections, aiming at the selection, collection, registration, storage, processing, and dissemination of knowledge in order to support current and long-term actions to preserve memory and its recovery.

In addition to this introduction, the article is organized into the following sections: the second section presents the main concepts that characterize the domain of agroecology and territorial development. The third section describes protocols for curating information in the digital environment based on references from Information Science, Open Scientific Communication, and Computing. The fourth section presents the method used in the research. In the fifth section, the results summarize the information obtained in the literature. The last section contains the conclusions and the direction for carrying out the next steps of the research.

## 2 THE DOMAIN OF AGROECOLOGY AND TERRITORIAL DEVELOPMENT

The concept of agroecology, first introduced in the 1930s, originated from the innovative practices of rural producers. Initially, this interdisciplinary field focused on promoting ecological conservation and the sustainable use of energy resources on farms. As highlighted by Bicksler *et al.* (2023) and Plateau *et al.* (2021), agroecology has evolved from a practical, localized approach to a more comprehensive scientific discipline that integrates ecological principles into agriculture while seeking to optimize relationships between plants, animals, humans, and the environment. This evolution reflects the growing importance of sustainable agricultural practices in response to contemporary environmental and social challenges.

From the 1970s onwards, with the mass dissemination of the Green Revolution package for the expansion of industrial agriculture around the world with the promise of ending hunger, this model of modern agriculture became hegemonic. However, until now the promise of eradicating hunger has not been fulfilled for reasons of a political nature, as stated Petersen and Monteiro (2020). Instead, this process has increased the concentration of income and land and the degradation of the environment, among other problems (Petersen *et al.*, 2020).

As an alternative to the current model of industrial agriculture, social organizations made up of environmentalists and members of the agroecological movement emerged, which began to include in their demands, in addition to the ecological dimension, the social dimension, and the political dimension to enhance transformations in the agricultural sector and the food system as a whole.

Therefore, the best-known concept of agroecology, propagated in the works of Gliessman (2015) and Marinho (2021), describes agroecology as a “science, practice, and movement”. Recently, international organizations such as the Food and Agriculture Organization of the United Nations (FAO) have recognized that agroecology is a path to achieving the Sustainable Development Goals (SDGs) for the 2030 Agenda. “It [agroecology] represents a way to inform a holistic approach to food and agricultural systems that can better meet the societal and biophysical needs of this current generation and generations to come” (Bicksler *et al.*, 2023).

Agroecology is practiced in different territorial contexts to operationalize desirable changes towards the construction of a solidarity economy and perhaps a more sustainable world. Because of this, agroecology cannot be conducted without being linked to the territorial approach. Inspired by Saquet (2007), Antunes Junior, Borsatto & Souza-Esquerdo (2021, p.2) describe what the territory is:

The territory can be understood as a multidimensional field (economic, social, environmental, cultural, political, institutional), where different social groups coexist and always interact through power relations, conflicts, and competition. In the territory, an identity exists, which is evident in its environmental characteristics, production system, cultural and social cohesion, and dynamics employed by the local actors, whether in the circulation of goods and services, movement of people, or communication exchange.

For Silva (2016), Kato, Delgado & Romano (2022), and Antunes Junior, Borsatto & Souza-Esquerdo (2021), territorial development advanced in Brazil since the 2000s, after the country's re-democratization, with the implementation of a political agenda for the decentralization of power and encouraging the social participation of sectors directly benefited from public policies with territorial impact. Thus, territorial development can be understood as explained by Ribeiro (2021, p.10):

Territorial development (local, endogenous, or bottom-up), involves the mobilization of actors, resources, and institutions with strong spatial links, with the aim of leveraging the competitiveness of local economic activities and providing social and cultural well-being to the community that lives in this medium.

For more information regarding governance models, territorial policies and programs, as well as infrastructure, secretariats, and ministries, consult the references cited above because detailing these aspects here, although important, goes beyond the main scope of the article. For now, it is worth highlighting the relevance of knowledge produced from agroecology and territorial development for boosting the economy; construction of public policies; agroecological transition, food and nutritional sovereignty; environmental conservation; sustainability, education in/from the countryside and other areas. Hence the importance of

managing the collection produced by PPGADT professors and students. The next section addresses the protocol(s) for the curation digital collections.

### 3 PROTOCOL FOR INFORMATION MANAGEMENT

Before moving forward on the protocol for information curation, it is important to define what a protocol is. Protocol is defined as accepted behavior, rules or procedures according to the definition in the Oxford Thesaurus (2007) apud Ahuja and Yang (2010, p.161). In the context of documentation and collections management, protocols are procedures such as the inventory, registration and cataloging of documents; controlled vocabularies; preservation techniques; collections management policy; adoption of a system for information management, and its protocols for integration between systems.

Among the protocols established for the preservation of a cultural asset, we consider the inventory process to be one of the first, initial, and primordial tools for the recognition of the collection, its quantification and qualification. The inventory fulfills the role of registration [...]. It represents one of the first access control protocols, preventing theft and losses, as well as being the first recognition strategy for evaluating collections (Panisset, 2017, p.169).

Other protocols in use, on the one hand involving the integration of online bibliographic collections for information retrieval, is the Z39.50 protocol used in the development of library management systems. On the other hand, for information architecture in an institutional repository or repository of multi-institutional collections aggregating content from different institutions, the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) communication protocol is used. The Open Archives Initiative or OAI is the standard that allows interoperability between systems for data feedback between systems (Rodrigues et al., 2011). This protocol has its origins in the open access movement for the democratization of knowledge and is currently the most used standard for creating a network of digital collections.

The digital collections network aggregates, preserves, and disseminates bibliographic, archival, museological information and scientific collections (Alves et al., 2017) through multi-institutional collaboration to make academic collections

available to society (Lavoie, 2022; Massie et al., 2023). In order to operationalize a network of digital collections, in addition to defining a governance model for the collaborative network and the form of partner participation, it is also necessary to provide for the development of collections, minimizing possible risks in relation to the security and preservation of digital information. Collection development is the procedure used by those responsible/managers of institutional repositories to form the institutional collection because it includes in the guidelines the criteria for selection, collection, registration, treatment, storage, and disposal of the collection, as stated by Hunter and Day (2005, p.10):

Collection development is largely concerned with content. As with any other digital library, decisions need to be made about which types of object should be included and which excluded from repositories [...]

[...] Aggregators need to make similar decisions about content to repositories, e.g. about subject coverage, the type of resources to be included, whether it needs to be peer reviewed. However, their choices may be limited by the extent and consistency of metadata made available by repositories

As we have seen, in this section the OAI protocol represents the technical requirement for building an integrated open information system, and the collection management policy or network of collections is the documentary protocol that assists both managers and employees in relation to content selection, accuracy of scientific information, description and validation of metadata as it guides the community in searching, user registration, and submission of academic production in the institutional repository.

#### 4 METHODOLOGY

The present study employed a methodological approach based on a bibliographical survey, with the objective of understanding fundamental concepts and theories related to protocols for the curation of digital information in the context of agroecology and territorial development. Von Hohendorff (2014, p.40) clarifies that literature review articles 'are texts in which the authors define and clarify a certain problem, summarize previous studies, and inform readers of the state of play in a given area of research'. Therefore, this method was chosen



because it is the most suitable for the theoretical and conceptual analysis necessary for our research objective.

Specific criteria were defined for the selection of literature: we prioritized publications from the last ten years to guarantee the timeliness of the information, in addition to including classic studies that support the area. The keywords used in the search included 'agroecology', 'territorial development', 'digital information curation', among others relevant to the topic. The databases selected were the CAPES Periodicals Portal and the Digital Library of Theses and Dissertations (BDTD), due to their wide coverage of academic literature and relevance in the Brazilian context.

After collection, the material was subjected to a content analysis, where we sought to identify and categorize the main themes, theories, and approaches present. This process involved critical reading of texts, identification of key concepts, and interpretation of findings in the broader context of agroecology and territorial development. Furthermore, a comparative analysis was carried out to identify gaps in the existing literature, especially with regard to the application of concepts in the context of the three public universities in the Brazilian Northeast associated with the Postgraduate Program in Agroecology and Territorial Development (PPGADT).

To ensure the comprehensiveness and impartiality of the review, a systematic analysis was adopted, reviewing each source of information with the same methodological rigor. Limitations of this method include the possibility of publication bias and restriction to the chosen databases, which may have excluded relevant literature from other sources..

## 5 RESULTS

The collection of information in specialized literature allowed us to delve into the domain of agroecology and territorial development to learn about the historical framework, the main concepts, and the relevance of knowledge of these two major areas of knowledge, which are not just restricted to application in the economic market, but it has a cultural and identity value for traditional

communities in different rural territories. And all this knowledge has been systematized over the years in universities and research institutions.

As for publications registered in articles, theses, books, abstracts, videos, booklets, etc., the majority of these works went through the peer evaluation process that attested to the quality of the PPGADT digital collection. In this sense, the information services of the associated universities to run the course. Professors and students need to join forces for curation and information management work that guarantees, in addition to the preservation of memory, the recovery and dissemination of knowledge among institutional peers, enabling the use of the collection as a source of information and/or learning resources in technical courses, classes and new research in the present and in the long term.

During the documentary research, we identified the obligation to deposit the thesis and its final product in the library where the PPGADT course is offered. However, there is no mention of how other digital publications produced during the course will be managed. The collection or information management policy establishes the selection criteria for various documents for the institutional repository. Contrasting what is standardized with the PPGADT collection management actions in practice can help to understand the organization and work method, the difficulties, and overcoming in making information available in the institutions investigated.

It is worth noting that the expansion of a multi-institutional collections network is one of the strategies for integrating and disseminating knowledge, through various databases that are hosted on various websites. The benefits highlighted are: the centralized search for content by users and the network collaboration that is established between institutions managing scientific information. The basis of the collections network service is the OAI protocol and curation activities to detail metadata aiming to correctly identify the origin, authorship, confidentiality, and preservation of the digital document, as online information grows exponentially.

## 6 CONCLUSIONS

The partial conclusions of the study highlight the effectiveness of the distributed management process of scientific information in the context of the Postgraduate Program in Agroecology and Territorial Development (PPGADT), involving three universities. However, we identified a significant challenge: the dispersion of academic information across multiple locations, which creates barriers to access and effective dissemination of knowledge.

To address this issue, the proposed next step is to carry out detailed field research. This research aims to contrast current collections management practices at PPGADT with the information policies of the institutions involved. The objective is to identify strengths, limitations, and opportunities for improvement in these practices and policies.

We hope that the data collected in this field research will provide valuable insights for the development of a general protocol for the dissemination of knowledge in a network. This protocol will seek to incorporate the principles of open science, promoting greater accessibility, transparency and collaboration in sharing scientific information. The ultimate goal is to facilitate access to the knowledge produced, maximizing its impact and usefulness for both the academic community and society in general.

This study, therefore, not only highlights the importance of efficient information management practices in academia, but also paves the way for future initiatives that aim to improve the curation and dissemination of scientific knowledge in critical areas such as agroecology and territorial development.

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