

A Geospatial and Human Geodetic Perspective on Rural Territorial Development

Landentwicklung aus georäumlicher und humangeodätischer Sicht

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Summary

Rural territorial development is in need for new theoretical conceptualisations, tools and instruments. Yet, despite the increasing abundance of data, there is still a disconnect between policies and information. This article tests to which extent the domains of geospatial science and human geodesy can support the further development of theoretical grounding in rural development. The justification for this comes from boundary object theory, which claims that scientific development benefits from connecting and integrating concepts from different scientific domains. The two additional domains support further theoretical grounding and expanding of rural concepts and conceptualisations. For example, the concepts of vitality and vibrancy can offer a continuous and less discrete insight in the degree of rural development, whilst they are simultaneously grounded in human principles. Similarly, social and human aspects of property and property relations underline that rural development is foremost an activity of human development in a social context. Consequently, rural territorial development conceptualisations and theory development need to go beyond particular administrative scales and need to rely on new insights into human behaviors and human values. The relevance for practical policy making is detecting new proxies influencing rural development outcomes.

Keywords: land development, geosciences and human geodesy, theoretical foundations, concepts and conceptualisations

Zusammenfassung

Die Landentwicklung braucht neue theoretische Konzepte, Werkzeuge und Instrumente. Denn Politik und Entscheidungsträger benötigen aggregierte und aufbereitete Informationen, um in der zunehmenden Fülle an Daten die richtigen Weichenstellungen und Entscheidungen treffen zu können. Der Beitrag greift dieses Problem auf und untersucht, inwieweit die Bereiche der Geoinformatik und Humangeodäsie die Weiterentwicklung der konzeptionellen Grundlagen der ländlichen Entwicklung unterstützen können. Ansatzpunkt der Betrachtungen ist die Boundary Object Theory, die besagt, dass die wissenschaftliche Entwicklung von der Verbindung und Integration von Konzepten aus verschiedenen wissenschaftlichen Bereichen profitieren kann. In diesem Sinne führen die Verknüpfung von Geoinformatik und Humangeodäsie zur weiteren theoretischen Fundierung und Erweiterung von Konzepten und Konzeptualisierungen des ländlichen Raumes und seiner nachhaltigen Entwicklung. So können beispielsweise

die Konzepte der Vitalität und Lebendigkeit einen kontinuierlichen und weniger diskreten Einblick in den Grad der ländlichen Entwicklung bieten, während sie gleichzeitig auf menschlichen Prinzipien beruhen. Ebenso unterstreichen die sozialen Aspekte des Eigentums und der Eigentumsverhältnisse, dass die ländliche Entwicklung in erster Linie eine Aktivierung der gesellschaftlichen Potenziale in einem gemeinwohlorientierten, sozioökonomischen Kontext ist. Folglich müssen Theorien und Konzeptualisierungen für die Landentwicklung über bestehende institutionelle Strukturen und eingespielte Entwicklungsprozesse hinausgehen und sich auf neue Erkenntnisse über menschliches Verhalten und menschliche Werte stützen. Die Relevanz für die praktische Politikgestaltung liegt in der Ermittlung neuer Indikatoren, die die Ergebnisse der ländlichen Entwicklung beeinflussen.

Schlüsselwörter: Landentwicklung, Geowissenschaften und Humangeodäsie, theoretische Grundlagen, Konzepte und Konzeptualisierungen

1 Introduction

Rural development theories and concepts require an update. In various publications Professor Dr. Holger Magel from the Technical University of Munich already calls for this need for new or adapted new theoretical conceptualisations, tools, instruments, and administrations of rural territorial development (Magel et al. 2022, Magel 2015, Magel 2011). There are three fundamental justifications for this update requirement.

The first originates from practice and implementation of rural development policies and projects, such as in Germany, European Union and China for example. Rural territorial development (in German: Landentwicklung) is a specific term, which Magel (2001) defines systematically differently than rural development (in German: Ländliche Entwicklung). Magel (2015) notes that rural territorial development does not only deal with acquisition, distribution and allocation of (land related) resources, but it relates to five essential components of spatial administration and governance (referred to as the “Pentaphony of land management”): (1) ensuring equivalent living conditions in urban and rural areas, (2) activation, consulting and directing; (3) surveying, documenting, planning, linking and coordination; (4) approval of plans, implementation, and financing; (5) land arrangement and conflict resolution (on

the ground) and updating cadastre and land registry. Rural territorial development is thus no longer conceptually and pragmatically considered equivalent to optimizing agricultural production in sparsely populated areas, but the reality of practitioners has derived that it has become a broader concept emphasizing enhancing working and living conditions and creating better conditions for access to public facilities and services in all regions of a country. One sees this development also back in the changing agricultural and rural development policies of countries and regions. The EU Common Agricultural Policy (CAP) 2023–2027 and the European Green Deal make a clear reference to rural development and the specific needs of rural areas, and advocates a better integration between agricultural development, and environmental development (European Commission 2023). The CAP has entered into force as of 1 January 2023 and aims – amongst others at “Fairer income for farmers and keeping rural areas vibrant”. The CAP furthermore specifically states that “at least 35 % of the rural development are allocated to measures to support climate, biodiversity, environment and animal welfare”.

This broadening of practice has indeed found its way in academic literature as well. Lu and de Vries (2021) indicate how the changes in practice have also resonated in changes in theoretical discourses on rural development (yet perhaps not specifically on rural territorial development). An evaluation of a large corpus of literature throughout the years indicate that gradually the focus of attention in rural development has shifted from agriculture to socio-cultural changes, environmental issues, climate change, renewable energies and rural enterprising, amongst others. The case studies of new policies and new kinds of projects in Germany, the EU and China, for example show furthermore that there is a need for broader and integrated concepts which are rooted in both spatial characteristics and variations (i. e. where are which kinds of problem and where does what need to be undertaken) and thematic attributes (what and which issues should be changed). In a country like China, we see for example, Magel et al. (2022) describing how land and spatial development in China follows to a certain extent similar types transformation trajectories in rural development as in Germany, and (Lu and de Vries 2022), who characterises the different phases of transformations in rural development discourses and narratives in China. What becomes clear from these transformations is not only that the concept of rural territorial development is changing, but also that one needs new ways of measuring and evaluating rural territorial development. Li et al. (2015) defines for this reason new rurality indices for China. One could approach and address this need from geospatial sciences which incorporate both of these qualities (i. e. both the where and what). Searching from geospatial examples and concepts could potentially derive new concepts and narratives on rural development. The subsequent section will address this geospatial perspective.

The second justification for an update in the thinking about rural development comes from the change in (inter-

national) development discourses. A prominent change is visible in rural development discourses for Africa. Binns et al. (2023) describe for example how rural development has changed in different African countries and in African policies. Whereas previously rural development discourses on Africa primarily dealt with poverty, human and societal development in a broader sense is currently more crucial and a closer link to sustainable development goals (SDGs) has become more relevant (Sachs et al. 2023). Furthermore, a central issue in rural development in Africa is access and ownership of land (Binns et al. 2023), which is not only central for security of food, water and sanitation, but also considered a basic human right (Derman et al. 2013, Lipton 2009).

From a more European context, one can see human related new notions and objectives emerge, such as the need for rural vitality and rural vibrancy (Koomen 2011, Mack et al. 2018, Makkonen and Kahila 2021), social cohesion (Dax and Copus 2018, Avery et al. 2021), socio-spatial equality and equivalency and human and community responsive methods of division allocation and distribution (Chigbu et al. 2017). Although many of these terms appear to be part of broader sociological and anthropological concepts, the fact that they are gradually associated with rural development demonstrates a shift in emphasis of a general static appearance of social relations within rural areas towards a rural territorial development in a broader national and global context of social relations and human values. In other words, what are the ground conditions of social behaviour within rural areas which contribute to the overall well-being, and ultimately to the “human dignity” and “human rights” to which (Magel 2015) is referring. This requires a further elaboration and testing of these terms in a real-life context. Practice ultimately has to be built on proper theoretical foundations. Hence there is a need to generate new concepts from what I refer to as a human geodetic and human geographic perspective.

The third justification comes from a science and technology philosophical and heuristic perspective. Rural development concepts need to connect to multiple scientific disciplines. Hence, there is a need for boundary work in the sense in which Star and Griesemer (1989) define boundary concepts and boundary work. One could argue that for too long the epistemic and ontological concepts and values of rural development have been stuck in assumed fundamental differences between urban and rural (areas, functions and needs). Bringing new perspectives in requires therefore boundary work, boundary workers, and possibly, also new boundary objects. For these reasons, this article relies on the methodological concepts of boundary work.

This article starts by formulating the methodological concepts of boundary work, which derives the justification for a geospatial and human geodetic perspective. It then presents these respective perspectives, by the boundary work analytical approaches. From these, the article derives possible core concepts and axiologies which will be relevant in future research on rural territorial development.

2 Methodology

This article is using the reasoning from the philosophy of science. New conceptual and theoretical thinking comes from how to define a science. Crucial concepts are ontology, methodology, axiology and epistemology. When arguing that rural territorial development requires corner stones of science, one must define these, either from within the rural development discourses and/or with the use of other scientific discourses.

One way to define such corner stones is by a practical implementation of boundary work (Swedlow 2017). Langley et al. (2019) furthermore define it as purposeful individual and collective effort to influence the social, symbolic, material, or temporal boundaries, demarcations; and distinctions affecting groups, occupations, and organizations. This implies having to conceptualise beyond traditional boundaries. In the context of this article, one could posit that the practice of rural territorial development exhibits a different spatial dimension than conventional rural development, from a measuring and mapping perspective as well as from a policy (design and implementation) perspective. Integrated rural development occurs for example at different geospatial scales than village renewal or traditional land consolidation projects. This implies that geospatial scale and the definition of geospatial units are important elements (or boundaries and demarcations) in redefining or re-evaluating aspects of rural development. For this study different geoportals on rural development were evaluated, with a specific purpose to see how rural areas and rurality are defined and how this impacts insights on degrees and locations of development.

Secondly, the boundary work of (Mollinga 2010) works with three types of analytical trajectories:

- (i) identifying and/or developing suitable boundary concepts that allow thinking of the multidimensionality of issues;
- (ii) configuring adequate boundary objects as devices and methods that allow acting in situations of incomplete knowledge, nonlinearity, and divergent interests; and
- (iii) the shaping of conducive boundary settings in which these concepts, devices, and methods can be fruitfully developed and effectively put to work.

Here we could directly quote Magel: rural territorial development requires geodesists (Magel 2015). Yet, these geodesists should not only focus on (re-)measuring, (re-)shaping, (re-)adjusting, (re-)allocating, (re-)valuing and (re-)planning land, but also be concerned with several social, cultural and political dimensions of land. This implies the need for a new theoretical geodetic perspective, which reasons from the fundamentals of human and social concepts. The new boundary objects are thus human objects from which both human and development scientists can formulate notions and strategies and technical engineering scientists can construct interventions and changes in a status quo. For this reason, a human geodetic perspective is introduced

aiming to formulate new notions and perspectives of rural territorial development. Finally, the boundary work should derive new concepts and/or principles.

3 A geospatial perspective on rural territorial development

Mapping and visualising developments in rural spaces and territories has always been challenging, despite the multiple examples and projects which aimed to do so. As an example, the study compared a number of rural (territorial) development geoportals, based on the main functions provided by this geoportal tool, the manner in which the geospatial units and levels of detail are defined for rural regions and/or for rural data, the way rural and/or rurality is defined, the target users and main beneficiaries of the tool, and the degree to which the tool is interactive.

In Europe, the rural observatory (<https://observatory.rural-vision.europa.eu/?lng=en&ctx=RUROBS>) collects and presents maps and data in direct connection to the relevant EU initiatives for rural areas and analysing the achievements of the EU Rural Action Plan. It comprises of data related to 9 categories which each have subcategories, from which one can derive locational analyses, as well as thematic trends, at 4 territorial spatial levels from 1990 until 2022. The main functions include: proving a base source of information for “rural proofing”, evaluating and assessing the impact of EU legislative initiatives on rural areas, and providing evidence for policy making in relation to rural areas development. The fundamental geospatial unit is country boundaries, but one can also see trends at a specific level of granularity (regions, sub-regions, municipalities) by displaying it in a map view. The portal defines rural as the concept of remoteness, defined as the driving time to an urban centre exceeding 45 minutes. Interaction possibilities exist, but only partly. Select, view and download are possible. Upload of own data and modification not. Despite the relevance of this portal, it is not clear who the main users or beneficiaries of this portal are. Both the choice of data categories and levels of detail highly depend on the portal constructor and on the principle of harmonised data and not so much on actual needs of practitioner spatial planners and land managers and customised data and data categories of communities in different locations. In spatial data infrastructure discourses one would refer to this as the divide between just-in-case-data instead of just-in-time-data (de Vries 2006, Nedovic-Budic et al. 2011).

For Germany specifically, there are, besides the data collections of the BBSR, such as the Geodienste (<https://bbsr-geodienste.de/>) and the INKAR (www.inkar.de), which each provide statistical indicators on a number of relevant rural aspects, several other national data collections. A specific example of a comprehensive set of geospatial rural development indicators in Germany is the Thünen's LandAtlas (www.landatlas.de). The Atlas constructs a multifaceted indicator “rurality” which differentiates municipal-

ities based on a set of relevant rural indicators. A rural area itself is loosely defined. The main beneficiaries seem to be regional and national policy makers and possibly academics. A high degree of rurality could theoretically imply a high priority for rural development action. Yet, studying and comparing the underlying social processes may provide a very different spatial patterns than just comparing indicators per municipality. Deppisch et al. (2022) and Deppisch and Klärner (2021) note therefore that a rurality indicator is indeed part of the evidence whether a region is structurally weak or strong, but it does not solely explain (changes in) human perceptions and preferences in specific municipalities or entire regions. In a similar study on regional political and perceptual differences and their relation to spatial development, (de Voogt and Cuperus 2021) that there are indeed spatial differences when comparing the trust in the political administrative system on the one hand and the economic welfare on the other, but that these are not necessarily spatially causally related. Instead, access to development opportunities and social capital differs throughout the country, which causes spatial clusters of inequalities and disparities. Hence, there are trends in human perceptions in relation to rural territorial development which are not necessarily municipality specific, but context and policy specific. The spatial nature of rural phenomena needs therefore be better connected to its context when formulating and implementing rural territorial programs.

A frequently used source of rural information for China concerns the China Rural Statistical Yearbook, available through the China Rural Statistical Yearbook of the National Bureau of Statistics (NBS) – www.stats.gov.cn/english/Statisticaldata/yearbook/. Its main function is a systematic comparison of multiple data about rural areas. The geospatial units or levels of detail used for the data can vary, but common units include administrative divisions such as provinces, counties, and townships. Rural and rurality are strictly based on institutional territorial differences. China divides territory into towns and rural villages and collects and distributes data accordingly. The main beneficiaries seem therefore primarily national and regional policy makers, but most Chinese academics primarily rely on these data sources. Interactivity with the data is relatively limited. One can indeed select, view and download, but contrasting data with comparable data or uploading of own data is not possible, let alone modifying or commenting on the data.

What one can derive from this is that spatial data and non-spatial data on rural territorial regions need to be better connected. Comparing and evaluating these data demonstrates that one of the main problems is that the multifaceted nature of rural territorial development does not sufficiently nor necessarily align with the spatial (discrete) administrative boundaries of government structures. For example, certain types of rural villages and their problems may not necessarily be spatially linked, but can still be classified based on both spatial and non-spatial criteria (Groß et al. 2011). This implies also differentiated development strategies, which are neither purely spatial nor purely

socio-political or economical. One could argue that indicators of rural territorial development should in principle rely on combinations of indicators which measure gradual and non-discrete values and changes of societal and environmental phenomena. Consequently, any construct of rural territorial development is rather a continuous (instead of a discrete) geospatial variable. Nevertheless, at the appropriate level of detail, discrete variables are both pragmatic and political choices, which need to be understood in their respective pragmatic and political contexts and purposes.

Furthermore, here are indicators at different levels of details, and policies at different levels of administration or intermediate, or inter-connected levels of administration. This implies on the one hand that one should not just consider one-dimensional/idiosyncratic data at a single scale if one wants to create a rural territorial development policy but rely on a multi-verse or multi-dimensional data with multiple aspects, which somehow need to be integrated and optimized, whilst being customized and accommodated to a local context. This is a wicked or complex problem in nature. Hence, it requires new adaptable and flexible geospatial models, theories and tools which connect objective data to subjective and political realities.

4 A human geodetic perspective

Rural territorial development relates to geodesy, or better, is part of the existential nature of geodesy. Geodesy in its core is the science of locating, measuring, detecting, dividing, and allocating land and changes in land. Traditionally, these activities are predominantly technical, mathematic and computer-aided activities and usually fit within broader engineering, geo-scientific and spatial planning projects. However, for many reasons these activities affect and influence humans, human values, human perceptions and human behaviour. Magel (2015) posits that “When we talk about equivalent living conditions in towns and villages, we must speak of the **human dignity** and **human rights**”. The main implication of this statement is that rural territorial development needs to adhere to key principles of (human and spatial) justice in order to become sustainable and responsible. Magel (2016) furthermore argues that the concepts of equivalent living conditions and spatial justice should be central concepts for surveyors, geodesists and land managers as responsible and accountable division and allocation of space and spatial activities and authorities is part of their job objectives. From this (de Vries 2017b) argues that there is a need for new concepts and paradigms constituting a research domain and a set of axioms of human geodesy. Part of this domain construction is the introduction of human and social value discourses into the geodetic epistemologies (de Vries and Voß 2018, de Vries 2022), and part is converting the legal, governance, public administrative and policy methodological advances in land management of Magel (Magel and Chigbu 2022, Magel 2017, Magel et al. 2022) into (human) geodetic principles.



Fig. 1: Planning meeting in Spančevo, a village in the municipality of Češinovo-Obleševo, North Macedonia

The first part deals with constructing and relying on new concepts such as human reference, human recognition, human boundary objects, operant subjectivity (de Vries 2017b), the second part deals with formulating new rules, axioms and cause-effect relations.

On testing of the new human geodetic concepts in a rural setting there are various recent examples. The first concerns the role of human recognition in rural development. Maduekwe (2020) defines it as “the extent to which an individual is acknowledged by others to be of inherent value” and evaluates how much it impacts women and women farmer’s ability to access land in rural areas of the one hand and facilitate wellbeing on the other. What becomes surprisingly clear in subsequent publications is that rural development indicators insufficiently capture the wicked trade-offs which women in rural areas in developing countries need to make in order to gain access to land and be part of rural development benefits (Maduekwe et al. 2019b, Maduekwe et al. 2019a). This includes acceptance of reduction of formal land right certification to reduce domestic violence in a household, for example. The immediate consequence of this insight is that rural development policies currently inaccurately consider these wicked inter-relational effects occurring in rural communities.

A second example in which these human and social effects play a role concerns the activity of land consolidation. De Vries (2022) finds that executing land consolidation projects always depends on epistemic expertise which can be discretionary and inter-dependent on operant social values. This implies that no matter how well regulated a project may be, it still requires at some point in any project a set of human interactions and often also discretionary decisions (Fig. 1). This is in itself not necessarily problematic or in conflict with any rule or regulation, but it demonstrates that such processes depend on choices which may not be neutral and should therefore rely on a proper understanding of operant human values. This is also confirmed in (Sommer and de Vries 2023), who claim that.

Other human concepts which have emerged in rural discourses are vitality and vibrancy. De Vries et al. (2022) describes how the degree and location of vitality in a rural

region can be measured, but also mentions that people’s social networks and social coherency do not stop at administrative boundaries, but rather at the boundaries of these networks. Consequently, rural territorial development should somehow find a way to conceptualise the spatial ecology or spatial footprint of these socio-spatial networks. If these are fluid and dynamic, then vitality and vibrancy are not discrete spatial variables related to a single location or an administrative area but rather a variable which behaves like a stochastic/random variable. Its value is then defined by a probability, as vitality and vibrancy are not always the same at the same time and the same location. In the context of constructing a rural development policy this is complex because it implies having to adapt the policy to changing insights and probabilities of insights. Practically, it implies having to regularly monitor and reflect on whether a certain measure is still appropriate or not given new insights in operant human values, priorities, and behaviour.

The German CAP (in German: GAP – Gemeinsame Agrarpolitik – (BMEL 2023)) – has 9 specific goals, which are also multifaceted for rural areas, such as “SZ 7 – Promotion of young women farmers, young farmers and business start-ups in rural areas” and “SC 8 – Promotion of employment, growth, gender equality, social inclusion and local development in rural areas, including the bioeconomy and sustainable forestry”. The BMEL (2023) further sees that “Rural areas in Germany should continue to be attractive places to live and do business in the future and continue to gain in appeal. An important starting point for this is business development in rural areas and – for the agricultural sector – increasing its attractiveness for the next generation.” This observation is in line with the findings of (de Vries 2018) and (de Vries 2017a), who also note that both attractiveness and lucrateness are possible in rural areas, as long as a number of ground conditions are met.

5 Discussion – boundary work of constructing new principles

On the part of developing new rules, axioms, and cause-effect relations one could derive a set of basic principles from both a geospatial and a human geodetic perspective. A traditional boundary in rural territorial development would be to reason from rural territories. Instead, one could also reason from rural locations, or locations in which rural issues matter (to people). The first principle would thus arise from the principle of locating what is relevant for rural development, not just from a static point of view (i. e. where human settlements, infrastructure and public services are), but from how and where the humans influence their space (Fig. 2). The first principle from human geodesy is therefore that locating relevant activities and policy interventions is a socio-spatial choice, which influences **human behaviour** social-spatially. In other words, by observing socio-spatial choices one can derive or predict human behaviour in locating and vice versa.



Fig. 2: Knowing traditions in rural development - Village settlement in the province of Java Barat, Indonesia

The second principle is that measuring, dividing, and allocating (of land, land use and land values) is not neutral nor independent from human behaviour, options, and preferences. It relates to social, political, institutional, and legal choices and norms which administrations at all levels and communities construct in relation to systems of rights, restrictions, and responsibilities. The second principle of human geodesy is therefore that measuring and dividing relates to operant and dynamic human **perceptions, preferences, choices, and norms**. In other words, by observing the way people measure and divide, one can detect and derive human perceptions, preferences, choices and norms at a specific moment in time and place, and vice versa.

A third principle is that allocating rights is fundamentally rooted in social relations and affiliations, in particular in rural areas (Gerend 2020). The social aspects of property rooted in for example the German constitution – art. 14 – play a key role here. Despite the fact that this constitutional principle is not universal globally (Lubens 2007), in many institutional contexts social obligations and conformity to social contracts are fundamental conditions in regulating property. Re-allocating land rights, responsibilities and restrictions is part of a larger territorial development strategy, which applies to all people within the territorial boundaries, and in which all people within those boundaries are direct or indirect stakeholders and shareholders. There is in other words a common interest which needs to be balanced with private interests. The third principle of human geodesy is therefore that all interventions in land rights, responsibilities and restrictions require tools and mechanisms which (responsibly) **balance public and private interests to land**.

The fourth principle is that information detection, registration as well as transparency, openness and assessment of quality of this information is a fundamental axiology for geodesists (de Vries 2017b). For rural territorial development strategies information as such is not different, but the

axiology of having to understand and describe the quality of any type of information underlying any action is not always given. The fourth principle from human geodesy can thus be extended to rural territorial development, namely, that the quality of **all information must be open, accessible and transparent in order to be valid**.

6 Conclusions

This article started by noting that there is a need to develop new rural development theories, taking into account findings from recent research and practice. This article used examples from both geospatial science and practical geospatial repositories as well as examples from studies related to human geodesy and land management to derive new logics and principles. This boundary work is necessary to derive principles beyond traditional knowledge domains and discourses. The four major principles derived in this study both extent insights in rural territorial development, as well as adapt its current paradigms. Placing an emphasis on the human aspects with all its dimensions – not just human activities and human behaviour, but also operant and dynamic values, social interdependencies, discretionary preferences, and priorities – play an important role in understanding the changing social environments in which rural development actors operate. These human aspects are indeed not always linear and rational, and therefore policies cannot always foresee and cater for every eventuality. Instead, both in development planning and in its execution, there is a certain degree of pragmatism and improvisation required, supported by systematic and regular reflections on whether the current course is still relevant and sufficiently responsive to actual needs. This does indeed introduce uncertainty, but if decisions are properly documented in an open and transparent manner and changes in courses of action are adequately justified and consulted, they can lead to effective and acceptable actions.

There is however still a long way to go. As the knowledge domain relies on gaining insights from both practical and theoretical innovations, in both areas one needs to test and validate. Specifically for rural development projects, the human geodetic principles can be tested in the context of research on vitality, vulnerability, and versatility for rural communities, for example. In the areas of geospatial sciences there lies the quest to define new types of scales and units of analysis and verify to which extent these are sufficiently pragmatic and usable for development practitioners.

References

- Avery, E.E., Hermsen, J.M., Kuhl, D.C. (2021): Toward a better understanding of perceptions of neighborhood social cohesion in rural and urban places. In: *Social Indicators Research*, 157, 523–541.
- Binns, T., Nel, E., Dixon, A., Lynch, K. (2023): *Africa: Diversity and development*. 2nd edition, Routledge.
- BMEL – Bundesministerium für Ernährung und Landwirtschaft (2023): *Den Wandel gestalten!: Zusammenfassung zum GAP-Strategieplan 2023–2027* (Stand 20. März 2023).

- Chigbu, U.E., Schopf, A., de Vries, W.T., Masum, F., Mabikke, S., Antonio, D., Espinoza, J. (2017): Combining land-use planning and tenure security: A tenure responsive land-use planning approach for developing countries. In: *Journal of Environmental Planning and Management*, 60, 1622–1639.
- Dax, T., Copus, A. (2018): Towards vibrant, inclusive and sustainable rural regions: Orientations for a future rural cohesion policy. In: *European Structural and Investment Funds Journal*, 6, 198–209.
- de Voogt, J., Cuperus, R. (2021): Atlas van Afgehaakt Nederland. Over buitenstaanders en gevestigden.
- de Vries, W.T. (2006): Why local spatial data infrastructures (SDI's) are not just mirror reflections of national SDI objectives – case study of Bekasi, Indonesia. In: *The electronic journal on information systems in developing countries (EJISDE)*, 27, 28 p.
- de Vries, W.T. (ed.) (2017a): Attraktiv und lukrativ? Ideelle und finanzielle Wertschätzungen Ländlicher Räume. 19. Münchener Tage für Nachhaltiges Landmanagement, Lehrstuhl für Bodenordnung und Landentwicklung, Technische Universität München.
- de Vries, W.T. (2017b): Human geodesy – shaping a new science and profession for the world of tomorrow. FIG Working week 2017. Helsinki, Finland, May 29–June 2, 2017.
- de Vries, W.T. (2018): Opportunities and limits of making regions both lucrative and attractive. In: Hepperle, E., Paulsson, J., Maliene, V., Mansberger, R., Lisec, A., Guelton, S. (eds.): *Opportunities and Constraints of Land Management in Local and Regional Development. Integrated Knowledge. Factors and Trade-offs.* vdf Hochschulverlag AG an der ETH Zürich, 13–24.
- de Vries, W.T. (2022): Social Aspects in Land Consolidation Processes. In: *Land*, 11 (3), 452.
- de Vries, W.T., Chandran, R., Ampleman, L., Durán-Díaz, P., Pesoa Marcilla, M., Chaturdedi, V. (2022): Exploring geospatial methods of detecting rural vitality, vulnerability and versatility in rural regions in Bavaria. FIG Congress 2022, Volunteering for the future – Geospatial excellence for a better living. Warsaw, Poland, 11–15 September 2022.
- de Vries, W.T., Voß, W. (2018): Economic Versus Social Values in Land and Property Management: Two Sides of the Same Coin? In: *Raumforschung und Raumordnung | Spatial Research and Planning*, 76, 381–394.
- Deppisch, L., Klärner, A. (2021): “Gefühle des Abgehängtseins” in ländlichen Räumen? Ein multimethodisches Forschungsprojekt am Thünen-Institut für Ländliche Räume, Braunschweig. In: *Zeitschrift für Agrargeschichte und Agrarsoziologie*, 69, 85–89.
- Deppisch, L., Osigus, T., Klärner, A. (2022): How rural is rural populism? On the spatial understanding of rurality for analyses of right-wing populist election success in Germany. In: *Rural Sociology*, 87, 692–714.
- Derman, B., Hellum, A., Manenzhe, T. (2013): Land rights, human rights and development: Contestations in land restitution, Limpopo Province, South Africa. In: Derman, B., Hellum, A., Sandvik, K. (eds.): *Worlds of Human Rights*. Brill, 49–81.
- European Commission (2023): Report from the Commission to the European Parliament and the Council. Summary of CAP Strategic Plans for 2023–2027: joint effort and collective ambition.
- Gerend, J. (2020): Lessons in Rural Persuasion: Village Infill Development in Bavaria, Germany. In: *Sustainability*, 12 (20), 8678.
- Groß, C., Ritzinger, A., Magel, H. (2011) Auf der Suche nach dem Dorf von Morgen. In: *disP*, 2/2011, 44–55.
- Kommen, E. (2011): Indicators of rural vitality. A GIS-based analysis of socio-economic development of the rural Netherlands. In: *Research Memorandum*, 2011-50.
- Langle, A., Lindberg, K., Mørk, B.E., Nicolini, D., Raviola, E., Walter, L. (2019): Boundary work among groups, occupations, and organizations: From cartography to process. In: *Academy of Management Annals*, 13, 704–736.
- Li, Y., Long, H., Liu, Y. (2015): Spatio-temporal pattern of China's rural development: A rurality index perspective. In: *Journal of Rural Studies*, 38, 12–26.
- Lipton, M. (2009): *Land reform in developing countries: Property rights and property wrongs*. Routledge.
- Lu, Y., de Vries, W.T. (2021): A Bibliometric and Visual Analysis of Rural Development Research. In: *Sustainability*, 13 (11), 6136.
- Lu, Y., de Vries, W.T. (2022): A Discourse Analysis of 40 Years Rural Development in China. In: *Sustainability*, 14 (9), 5206.
- Lubens, R. 2007. The social obligation of property ownership: A comparison of German and US law. In: *Arizona Journal of International and Comparative Law*, 24, 389–449.
- Mack, G., Fintineru, G., Kohler, A. (2018): Do rural development measures improve vitality of rural areas in Romania? In: *AgroLife Scientific Journal*, 7, 82–98.
- Maduekwe, E., de Vries, W.T., Buchenrieder, G. (2019a): Measuring Human Recognition for Women in Malawi using the Alkire Foster Method of Multidimensional Poverty Counting. In: *Social Indicators Research*, 147 (3), 805–824.
- Maduekwe, E., de Vries, W.T., Buchenrieder, G. (2019b): Identifying Human Recognition Deprived Women: Evidence from Malawi and Peru. In: *The Journal of Development Studies*, 56 (8), 1594–1614.
- Maduekwe, E.O. D. (2020): Examining the economic impact of human recognition of women farmers in Malawi. Doctoral degree, Technical University of Munich (TUM).
- Magel, H. (2001): The change of paradigms in European rural development and land consolidation. In: *Zeitschrift für Kulturtechnik und Landentwicklung*, 42, 4–9.
- Magel, H. (2011): Landmanagement im Speckgürtel – Anmerkungen aus deutscher Sicht. In: *Géomatique Suisse*, 12, 576–580.
- Magel, H. (2015): Where is the Rural Territorial Development going? Reflections on the Theory and Practice. In: *Geomatics, Landmanagement and Landscape (GLL)*, 1/2015, 55–67.
- Magel, H. (2016): Räumliche Gerechtigkeit – Ein Thema für Landentwickler und sonstige Geodäten?! Prof. Dr.-Ing. Karl-Friedrich Thöne, dem geodätischen Brückenbauer und begnadeten Kommunikator, zum Gedächtnis. In: *zfv – Zeitschrift für Geodäsie, Geoinformation und Landmanagement*, 6/2016, 141, 377–383. DOI: 10.12902/zfv-0144-2016.
- Magel, H. (2017): Territorial justice for urban and rural regions? About the responsibility and role of the Bavarian academy of rural areas. In: *Geomatics, Landmanagement and Landscape (GLL)*, 1/2017, 65–79.
- Magel, H., Chigbu, U.E. (2022): Territorial Justice and Equivalent Living Conditions: Insights from the New Paradigm of Territorial Development in Germany. In: Barrós, D.M. (ed.): *Land Matters: Taking Stock and Looking Ahead. Selected experiences in memory of Rafael Crecente*. Universidade de Santiago Compostela, 75–102.
- Magel, H., Klaus, M., Spindler, K. (2022): “Alles unter dem Himmel” – Gedanken über die Weltordnung und (ländliche) Neuordnung in Bayern und China. In: *zfv – Zeitschrift für Geodäsie, Geoinformation und Landmanagement*, 1/2022, 147, 7–19. DOI: 10.12902/zfv-0358-2021.
- Makkonen, T., Kahila, P. (2021): Vitality policy as a tool for rural development in peripheral Finland. In: *Growth and Change*, 52, 706–726.
- Mollinga, P.P. (2010): Boundary work and the complexity of natural resources management. In: *Crop Science*, 50, 1–9.
- Nedovic-Budic, Z., Crompvoets, J., Georgiadou, Y. (eds.) (2011): *Spatial Data Infrastructures in context north and south*. CRS Press.
- Sachs, J.D., Lafortune, G., Fuller, G., Drumm, E. (2023): *Sustainable development report 2023. Implementing the SDG stimulus. Includes the SDG index and dashboards*. Dublin University Press.
- Sommer, F., de Vries, W.T. (2023): Values and representations in land registers and their legal, technical, social effects on land rights as an administrative artefact. In: *Land Use Policy*, 135, 106946.
- Star, S.L., Griesemer, J.R. (1989): Institutional ecology, “translations” and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. In: *Social Studies of Science*, 19 (3), 387–420.
- Swedlow, B. (2017): Three cultural boundaries of science, institutions, and policy: a cultural theory of coproduction, boundary-work, and change. In: *Review of Policy Research*, 34 (6), 827–853.

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