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Article

Assessing Rural-Urban Linkages and Their Contribution to Territorial Development: Insights from Zimbabwe's Small and Medium-Sized Cities

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Abstract: In Sub-Saharan Africa, unprecedented population growth, concomitant with limited industrialisation and job creation, have changed the configurations of rural-urban linkages in recent decades. Indeed, as primate cities do not act as strong engines of growth, territorial dynamics are rapidly being reshaped by renewed flows of people, goods, services and information within and between economic sectors, and between rural and urban areas. Rural densification and the fast expansion of small and medium-sized cities is one manifestation of these changes. As a result of silo thinking about rural and urban in most national strategies, plus the widespread informal economy and limited available statistics in the region, these new rural-urban linkages and their contribution to socioeconomic dynamics remain underexplored. Contributing to fill this gap, the aim of this paper is to present and test a method to assess rural-urban linkages and their possible role in territorial development in southern countries. We use a holistic approach and adopt an original posture, taking rural areas as the point of reference. Our method sets proxy indicators for specific information that is missing on rural-urban linkages. These indicators are then used to build a typology of territories according to potential rural-urban linkages, using a multivariate analysis and clustering. When applied to the case of Zimbabwe, the results reveal three types of districts, which differ in terms of the nature, intensity, direction and potential of rural-urban linkages for territorial development. We discuss the method's suitability in a diagnostic phase and how it could feed strategic thinking to mainstream rural-urban linkages in territorial development actions.

Keywords: rural-urban linkages; assessment; small and medium-sized cities; territorial development; Zimbabwe



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1. Introduction

The demo-economic transition in Sub-Saharan African countries, concomitant with globalisation, is unique. It is characterised by limited industrialisation and unprecedented population growth [1], with increasing rural population densities and rapid urbanisation. Urban centres of less than 300,000 inhabitants account for 60% of urban growth in the region [2] and human mobility and capital flows between rural and urban areas have intensified [3]. Given these structural characteristics, the historical role of rural-urban labour migration in SSA differs from that encountered in the demo-economic transitions in other countries or regions of the world [4]. Thus, although definitive rural-urban migration still prevails in many countries, it contributes less and less to urban population growth [5] and coexists with diverse migration patterns. Furthermore, the links between the countryside and cities do not just concern the usual transfer of labour from rural to urban areas. These links are increasingly dense, largely as a result of the circular migration of rural people. This calls into question the classic reading of the demo-economic transition [6]. The content and configurations of rural-urban linkages—flows of people, goods and services, money and information between rural and urban areas—have changed. Observations reveal that

these flows are multidirectional within and between economic sectors, as well as between rural and urban areas [7–9]. Rural-urban linkages blur the rural-urban divide [8,10,11] and their configurations vary according to territorial context [12]. A better appreciation of the role of rural-urban linkages is crucial for understanding territorial development in a specific area and the development asymmetries between different territories in Sub-Saharan African countries.

Over the past 30 years, data show that rural-urban migration has been redirected to secondary cities, especially small and medium-sized cities [2] defined either based on varying quantitative population thresholds, the position in the urban hierarchy or the cities' functional attributes [12]. In fact, growing evidence reveals how, by modifying production, distribution and consumption processes, these cities appear to have stronger linkages with rural areas than is the case for large cities [13]. Thus, they can contribute to regional dynamics and poverty reduction through rural-urban linkages [14–20]. Further, small and medium cities also play a role in managing natural resources to meet the needs of growing rural and urban populations in the face of environmental change [21,22]. These trends can be explained by core drivers. First, improved communications and infrastructure increase labour migration and the overall mobility of people between rural areas, large cities, and small and medium-sized cities [23]. Second, the structural adjustment plans of the 1980s and 1990s made living conditions significantly worse in large cities and many people moved to the countryside or smaller towns as a result [24,25]. Third, the decentralisation processes, which began in the 1990s, are helping to make secondary cities more dynamic [26]. Fourth, the growing demand for food and other goods and services in small and medium cities has intensified flows, strengthening territorial food systems around these cities [21,27].

The importance of rural-urban linkages—especially those linked to small and medium cities—in terms of contemporary changes and sustainable regional development is now recognised on a global level [28,29]. However, the new spatial dynamics have only just started to appear on the radar of public policies [11]. With the emergence of sustainable development over the last 15 years, space has gradually become a critical issue in international debate. The adoption of the UN 2030 agenda and the SDG in 2015 was a critical step. Particularly, SDG 11 acknowledges the importance of linkages between urban and rural areas and calls for stronger national and regional development planning. The New Urban Agenda (NUA), adopted at Habitat III in 2016, has played an important role, by addressing SDG 11 and its targets. UN member states agreed to policies that “support integrated urban and territorial planning and development”. The UN-Habitat report [30] on the implementation of the NUA (2017) and the ensuing UN-Habitat report, “Guiding Principles for Urban-Rural Linkages” (2019), [31] build on these endeavours.

African countries played a role in this debate. During the preparation of the Post 2015 Development Agenda [32], the African Union (AU) Commission developed the 2014 Common African Position. It stresses the importance of moving beyond “siloed” thinking on cities, which is reflected in the AU Agenda 2063. The Call to Action states: “Provide opportunities for all Africans to have (. . .) clean, secure and well-planned environments by: (. . .) Ensuring balanced development of all human settlements while embracing a rural-urban continuum (. . .)” [33]. Yet, despite the willingness to shift the regional dialogue on urbanisation in order to focus on the interactions between rural and urban spaces, the AU's strategic priorities remain largely sectorial. Rural and urban challenges still tend to be addressed separately [34], and planning and governance systems often fail to address the social and spatial consequences of the complex and shifting rural-urban connections [28]. Thus, their contribution to territorial development is overlooked.

One of the main difficulties is the lack of specific information about rural-urban linkages, particularly in southern countries, which do not have access to adequate data for a more integrated approach to territorial development [31,35,36]. This paper focuses on this information gap and the renewed role of rural-urban linkages in territorial dynamics and development. It contributes to the design and testing of innovative methods that seek to identify the local specificity and complexity of rural-urban linkages during the diagnostic

phase of integrated territorial approaches. In this perspective, the Swiss Development Cooperation mobilised some of the results presented in this article to enhance its cooperation programme “Zambia-Zimbabwe 2023–2026”.

The specific aim of the paper is to present and discuss a method to assess rural-urban linkages, their effects on territorial dynamics with regard to small and medium-sized cities, and their potential contribution to territorial development, supporting livelihoods and economic activities. By territorial development dynamics, we refer to processes of change in terms of social and economic structures and the institutional framework of territories, and the territorial development outcomes resulting from these processes (growth, social inclusiveness and environmental sustainability). We seek to answer three interlaced questions: how can we assess the rural-urban linkages associated with different-sized cities? To what extent may rural-urban linkages generate (or remove) value in a territory, by changing the dynamics of production, distribution and consumption? Lastly, what does this tell us about entry points for action to encourage local territorial development?

To answer these questions, the rest of the paper is structured as follows: by drawing on a critical review of theoretical and methodological developments, we build a comprehensive approach to consider the multidimensional drivers of rural-urban linkages and conceptualise space as a rural-urban continuum [37], where rural-urban linkages and agglomeration dynamics shape territories [38] (Section 2). Thus, we propose a method to assess rural-urban linkages and their potential for territorial development (Section 3). This method is applied to assess rural-urban linkages in Zimbabwe revealing three different kinds of territories in terms of the type of rural-urban linkages, their intensity and their potential to generate value in the territory (Section 4). Lastly, we discuss the method used and how our findings could enhance strategic thinking in Zimbabwe (Section 5). Section 6 presents the conclusion.

2. Rural-Urban Linkages: A Review of Theory and Practice

Space, and specifically, flows of people, information, goods and services between rural and urban areas are central to the agglomeration and location theories underpinning policy debates about models of regional development (“regional” or “territorial” development are used interchangeably, according to anglophone or francophone literature). This section presents a critical review of the later and describes the conceptual position adopted in this paper.

2.1. Spatial Differentiation, Development and Rural-Urban Linkages: Theories and Concepts

The first type of spatial linkage discussed in the literature on economics and regional development concerns the impact of urban centres on rural areas. In earlier standard economics, and in the new economic geography (NEG), building linkages between rural and urban areas was a matter of policy choice. Lewis’ dual sector model (1954) [39] and successive equilibrium-based models of structural transformation [40] and agglomeration [41] suggest that there is a positive link between urbanisation, economic growth, and poverty reduction. Another core paradigm is that of functional regional development, whereby regional development is considered as a function of national development and can be expressed in terms of two strategies: growth centre strategies and rural service centre strategies [42]. The growth centre strategy is derived from Perroux’s growth pole theory. It advocates urban industrial expansion in a few growth centres with a view to generating spread effects to modernise rural areas. The rural service centre strategy focuses on developing small centres and their hinterland. The development of market and service centres helps increase the productive capacity of producers. Thus, it promotes agricultural specialisation and commercialisation within a national economic growth framework. These centres have an impact on agricultural production (via local markets, product collection; inputs & services), which may generate rural and regional development. In these models, generally, the high end of the urban hierarchy receives the most support. Thus, these

models are controversial because they have increased the urban bias [43] in economic development policies.

Historical-structuralist approaches have described the inherent inequalities caused by urbanisation, as global capital is concentrated in cities and industrial sectors at the expense of rural society. This creates lasting spatial, social and economic differentiation, both nationally and internationally [44,45]. In developing countries, the development effects often appear to be limited in smaller centres and rural areas because growth centres have economic links with extra regional and overseas actors. Furthermore, the models advocating the polarisation of populations and capital accumulation in metro cities require high public spending, efficient and accessible infrastructure, a political purpose to achieve a territorial balance, high energy spending and control over externalities [46].

The second type of linkage is considered in terms of the impact that rural areas have on urban centres and non-agricultural activities. The literature on regional development recognises that the functions of small centres depend on developments in the hinterland. However, it is the literature on rural growth linkage that reflects this linkage in terms of specific consumption and production linkages [47]. Given the rural void in the literature and the potential for economic development in rural areas, researchers also explored the benefits and limitations of rural–urban linkages with regard to rural areas [48,49].

Rondinelli [50] argues that both opposed visions about the type of linkages to consider led to policies that misrepresent the relationship between urban growth and agricultural development and largely overlook the mutually beneficial linkage between the two. Thus, preliminary models emerged that propose a mutually reinforcing pattern of linkages between the town and the hinterland [27].

Since the late 1980s, geographers and political economists have proposed alternative concepts of the role of space and place in development, by presenting space as a social construct. In regional and national economies, rural and urban are “opposites no more” [51]. This comes with the concept of “rural urban continuum” [52] and the idea that rural-urban interactions “are not only symptoms of the ‘development process’ but are themselves active features in the transformation of rural and urban places” [53]. Rondinelli’s approach (1988) (‘Urban Functions in Rural Development’, UFRD) [50] can be seen as an attempt to link rural and urban areas within integrated spatial development strategies. However, aligned with the same tradition as Christaller’s classic central-place theory [54], the UFRD approach failed to consider the varying characteristics of urban and rural areas. Douglass’ (1998) innovative work on regional networks [55] pointed to the need for a spatially balanced growth strategy. He replaced the mostly mechanistic view of rural and urban with a more nuanced view of rural–urban interactions.

Drawing on Anglo-Saxon and French approaches [56–58], the “Proximity Dynamics” works [59,60] identify institutional, organisational and geographical proximity and argue that a major determining factor of the attractiveness and competitive position of a local production space is its capacity to generate specific resources [61]. This depends on whether the local space is autonomous or dependent on the dominant economic rationale, i.e., how much it relies on connections with other spaces. In a similar vein, work that re-examines the “economic base theory” [62,63] suggests that local development is driven by spatial interactions between the economic bases of near regions, rather than between a region’s base and the domestic economy. In the African context, research also points to the role of cooperation between regions, highlighting that cities are open, externally oriented systems whose survival depends on external trade [64]. However, wealth depends on the local production of goods and services. Cities must add value to natural resources and products made elsewhere, not simply exchange and distribute them. The more efficient, resourceful and innovative city enterprises are, the more wealth and jobs will be created. These approaches bring a recurrent question to the fore: whether or not the observed territorial development is linked to the metropolitan areas or to endogenous and ascendant dynamics in non-metropolitan areas, particularly dynamics pertaining to different types of economy of proximity [65].

2.2. Critical Review of Conceptual Approaches and Tools Used to Assess Rural-Urban Linkages

There are different ways to define and measure linkages, flows and interactions between rural and urban areas, which depend on theoretical orientation and research goals. Drawing on Rondinelli's (1985) initial classification of linkages in spatial development [66], Unwin presents an improved frame of urban-rural relations [67]. He suggests that there are economic, social, political and ideological linkages between urban and rural sites. They can be expressed physically as measurable flows of people, money and budgetary allocation. While these flows are associated with interactions between people, places and objects, they do not actually embody these interactions. Thus, labour flows are needed for an interaction between labour and capital, but they do not actually embody that labour-capital interaction. Other authors have listed various flows and linkages, leading to a broad classification in which urban-rural interactions correspond to the two-way flows of people, goods, money, technology, information and ideas [12]. Berdegue and Proctor (2015) extended the definition to the mutual flows of people, goods, services, money and environmental services between rural and urban locations [12].

The following review of empirical literature shows that successive methods and tools have been developed to assess rural-urban linkages, based on contrasting conceptual frameworks with regard to: the factors driving rural-urban linkages, their interactions, the geographical and temporal scales of analysis, and the initial rural or urban standpoint used to identify linkages.

An important preliminary approach to assessing rural-urban linkages involves regionally disaggregated analysis and economic modelling. Conceptually grounded in the rural-urban dichotomy, the aim is to measure selected economic flows and linkages at provincial and national levels (e.g., [68]). Most of the economic models that the rural-urban framework is based on are static, simplistic, and fail to account for socio-spatial realities, such as ecological conditions and growth potential in various locations [7] or different-sized urban centres. There are exceptions, for example, works that develop a Social Accounting Matrix (SAM) and economy-wide models for African countries, which differentiate between metropolitan cities, smaller cities and towns, and rural areas [69,70]. They show that structural differences, combined with strong and complex production and consumption linkages between urban and rural areas, determine the national benefits and trade-offs resulting from urbanisation and the implications of adopting urban or rural-oriented strategies. However, it is also important to consider historical, social, and cultural settings, as well as the institutions that govern space [71]. Combining aggregate modelling with information systems that capture local knowledge is a challenge. Sector-specific and domain-oriented economic research should work together to examine the opportunities offered by rural-urban linkages [7,27].

To overcome the rural-urban dichotomy, the "urban-rural gradient" or "rural-urban continuum" approach (cf. 2.1) was developed [37]. In practice, it envisages a continuous transition from urban to rural extremes, which is primarily indicated by land use and population density. The concept of the "urban-rural gradient" is still widely used as a spatial typology to contextualise data analysis in economic research [72]. Urban accessibility is featured in multiple classifications, as a measure of the travel costs of gaining access to urban services and job opportunities [35]. Hopkins and Copus describe typologies by identifying the strength of the economic linkages between small towns and the rural areas nearby [73].

The "rural-urban continuum" is associated with the greater integration of an urban area and its hinterlands. The notion has led to the mapping of Functional Economic Areas (FEAs), a second core conceptual and methodological frame to inform rural-urban linkages in empirical analyses. Here the geographical scale of linkages matters. A general type of linkage is formed by flows between a given urban centre and a large number of indeterminate, more or less distant rural areas throughout a country or even the world. These interactions may include environmental goods and services, the supply of "imported" food, and the provision of financial and ICT services to rural areas [74]. Conversely, in

the FEA approach, linkages are based on the relations between a specific rural area and a particular urban location, developed through systematic repeated flows of goods, services, people and money. Geographic proximity is a feature of this kind of interaction. There is strong reciprocal dependency and spillover between rural and urban areas, so much so that the urban centre and the rural hinterland can become integral components of a single rural-urban “functional territory”, which often cuts across administrative boundaries [12,75]. In practice, FEAs are designed around a metropolitan area or a major city’s “area of influence”, based on commuting flows and factors such as travel time, gridded population census, satellite images or public service delivery areas. However, little is known about how smaller cities are connected to the broad urban system [35,75,76].

City region systems provide a similar prominent conceptual frame and tool. This term refers to “the area within which the connections between one or more cities and the surrounding rural land are intense and functionally (economically, socially, politically and geographically) connected. These areas are typically 80–100 km across and cover up to 10,000 km² [77]. The city-region approach shifts away from administrative boundaries and sectorial development strategies towards territorial strategies, characterized by vertical and horizontal structures of governance and sectors [78]. The core features of a city region and how it is represented are the subject of debate. There are also ongoing discussions about its relevance for the Global South and the UN-Habitat planning guidelines for Africa [78,79]. In a case study in China, Yang et al. go a step further, by looking at the dynamic quality of FEA [80]. They measure Urban-Rural Integration (URI), defined as a stage in the evolution of urban-rural relationships. URI integrates the city and the countryside into an organic whole. The authors develop a conceptual framework structured on the “Basis, Driver and Goal”—the Basis being factor flows and interaction of industries, the Driver being the information transportation network and environmental carrying capacity, and the Goal of the URI system being to coordinate the living levels and achieve urban-rural equivalence—of the URI system. Then, they set up an URI index to assess the regional differentiation and explore the spatiotemporal change at the URI level. Based on data from national surveys, the index could reveal the strengths and weaknesses of the URI system and play a role in system diagnosis and policy guidance.

An approach similar to FEA attempts to articulate mechanistic and more nuanced views of rural-urban linkages and their drivers: Escobal et al. (2015) draw on NEG and economic sociology and identify two categories of factors, which determine how territorial relationships develop and how this affects spatial differentiation [81]. The first are “hard/tangible factors”, such as: geographical endowments, which determine comparative or absolute advantages; the existence of linkages (backward and forward) that cause the agglomeration of activities [82]; urban biases in government policies pertaining to taxing, pricing, and investment/spending [68]. The second category includes “intangible/soft” factors, typically socioeconomic networks, social capital and governance. Their limited conceptual and practical application has been the subject of debate. However, if combined with “hard” factors, they could improve our understanding of processes that lead to successful linkages with dynamic markets in rural territories [68,83].

Both FEA and the “rural-urban continuum” have been influential as operational frames to capture rural-urban linkages. However, their use has been limited in developing countries. This is mainly due to their data requirements and because they often focus on a specific position—an agglomeration or a remote area [35]. Some recent initiatives seek to overcome the challenge of data availability in southern countries and offer a broad perspective. The Urban–Rural Catchment Area (URCA) is a conceptual frame and tool [35], representing an urban centre’s extended area of influence. Essentially, it relaxes the need for strong social and economic interaction, which is a requirement of FEAs. The URCA is based on an urban centre’s size and where other urban centres are located. In practice, URCA is defined by matching all the rural locations to their urban centre of reference in terms of the time it takes to reach the urban centre. Each rural location is allocated to a specific category of travel time to reach one of seven categories of different-sized urban centres. This data

can be used to develop urban-rural continuum indicators. The new global spatial dataset for catchment areas makes it possible to account for rural-urban interconnections more systematically. This frame relies on available global data, but it tends to focus on physical factors (population size, distance), rather than other aspects of rural-urban linkages, e.g., ‘local’ historical, political, socio-cultural or ecological factors.

However, research on rural-urban linkages raises the need to consider the complex context-specific nature of these linkages and their potential site-specific variation [12,84]. Furthermore, other authors have elaborated on the distinction between “virtuous” and “vicious” linkages, which enhance or undermine accumulation and added value at household or territorial level [18,74,76]. In this way, the dominant methodological approach to rural-urban linkages in southern countries involves ad hoc “monographies” mapping rural-urban linkages. These focus on subnational levels and are based on mixed quantitative and qualitative methods [36,76,84–86]. With mapping, urbanisation and rural transformation are conceptualised and informed as intertwined mutually dependent processes. Considerable attention is often given to institutional dynamics. Qualitative methods, as participatory capacity-building techniques, are combined with quantitative tools (e.g., household surveys, value chain analyses, with diverse sampling frames). This provides more specific information and compares groups and locations. These methods often stem from research or development projects and the choice of territories depends on specific action-oriented goals. They offer an in-depth understanding of the drivers of rural-urban linkages and local socioeconomic change. These approaches also acknowledge that territorial development is built from the bottom up, as much as it is conditioned by regional or national trends [76]. They advocate the use of multi-scalar approaches to capture the inclusivity of spatial patterns and socioeconomic processes.

2.3. Conceptual Framework

We set out to assess the rural-urban linkages associated with diverse cities and to determine how the related flows change the dynamics of production, distribution and consumption, and generate (or remove) value in a territory, i.e., how they contribute to broad territorial development dynamics. We define a territory as a space that has a socially constructed identity and is subject to some form of authority [58,87]. This identity can be due to a combination of diverse factors, including regional history, ethnicity, culture, economic structure, biophysical conditions, infrastructure, social conflicts, and the influence of political-administrative boundaries [88].

We adopt a comprehensive approach to reveal the context-specific nature of rural-urban linkages and their outcomes. Our frame focuses on “direct” linkages between rural and urban areas that share geographic proximity [74] and acknowledges the importance of broader flows related to the national urban hierarchy. Thus, we conceptualise space as a rural-urban continuum [37], where rural-urban linkages and agglomeration dynamics craft territories, which may include an urban core or cores and which interact with peri-urban and rural hinterlands. According to the type, direction and strength of the rural-urban linkages involved in production, consumption and distribution, these relational territories generate specific socioeconomic outcomes. Woods and Helley (2016) point that research conducted from a relational perspective might start from a particular locality (a city, a town or rural district), without being constrained by it. It actually expands to follow flows and networks, which presents methodological challenges for research design and practice.

Figure 1 reviews our conceptual model to analyse rural-urban linkages and their effects on territorial development, particularly in terms of activities and incomes. As a starting point, we consider that the nature of rural-urban linkages (types, direction and intensity of flows) and their distributional effects are contingent on a set of local, national and international drivers. At the territorial level, drivers of rural-urban linkages are multi-dimensional. Some drivers are linked to rural and urban features, such as demography, infrastructure, productive orientation, natural resources, land system, distance and facilitators linking rural and urban areas (e.g., road and transport and telecommunication systems,

energy grids, rivers). Other drivers are also known as having a strong impact on potential rural-urban linkages. These drivers may be linked to the type of governance in rural/urban areas, which may involve actors in the public sector, private sector and civil society. They also refer to people's and households' agency and networks.

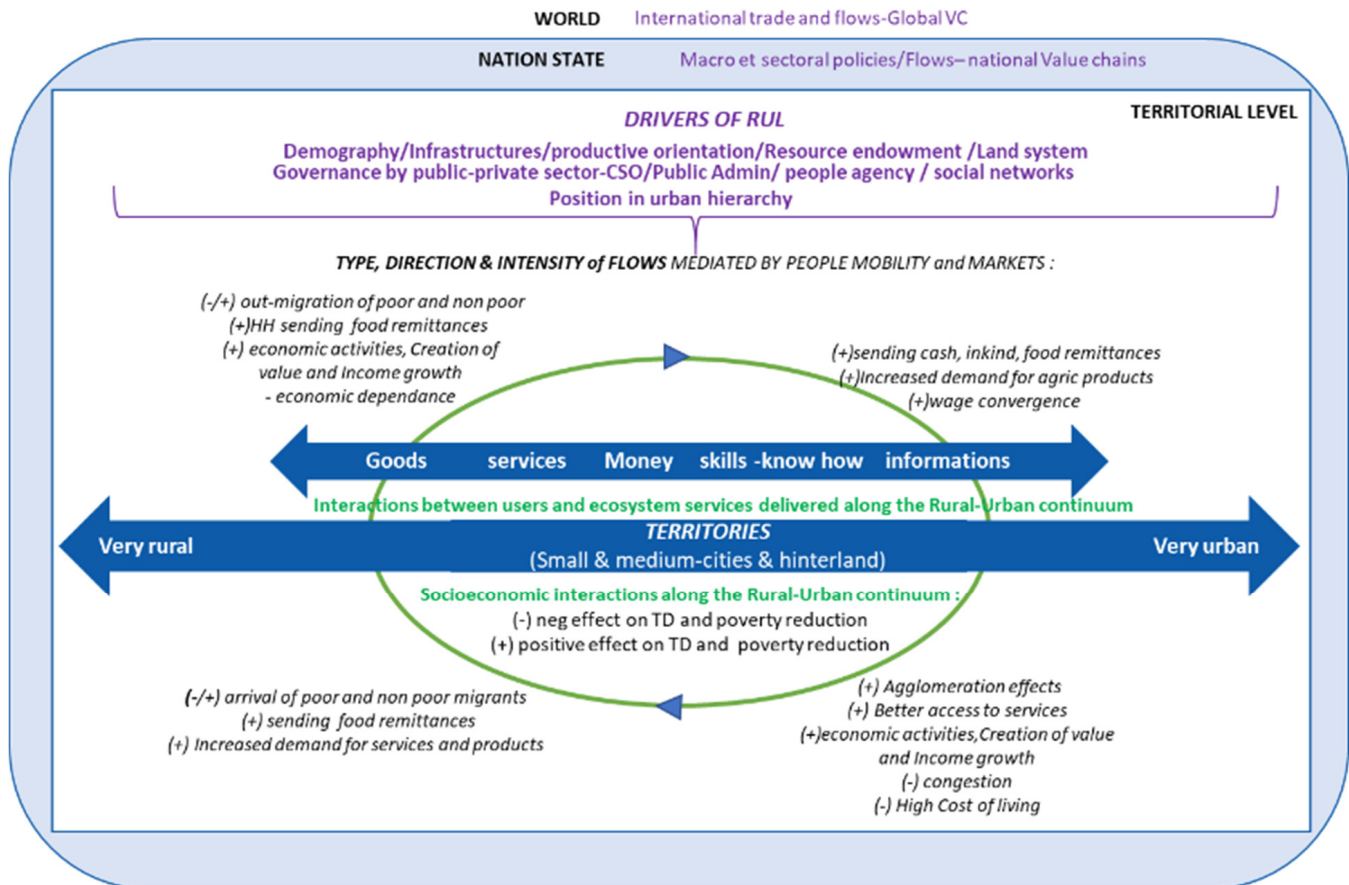


Figure 1. Rural-urban linkages to small and medium cities and their potential effects on territorial development (source: authors).

Over and above urban and rural features, we also consider the distance to different-sized cities, given that urban hierarchy could be a significant driver of rural-urban linkages [89], particularly for access to services and jobs. Lastly, forces at national or global level (e.g., international trade, climate change) may indirectly influence the drivers of rural-urban linkages and their outcomes. Together, these drivers influence the type of flows (money, people, information, goods, services), their direction and intensity along the rural-urban continuum, through markets and migration. Ecosystem services, which allow benefits to be shared across different areas, highlight the ecological interdependence of rural and urban territories. The socioeconomic features and dynamics within the territory will reflect the positive or negative effects of rural-urban linkages on activities, incomes and broad territorial development outcomes.

3. Materials and Methods for Identifying Rural-Urban Linkages in Zimbabwe

3.1. The Choice of Zimbabwe as the Case Study

Zimbabwe is a country with longstanding and changing rural-urban linkages. These are connected to fast-growing small and medium cities and migration dynamics. They have significant potential to support territorial development [90].

In Southern African countries, patterns of urbanisation have rapidly evolved. In the last 40 years, nearly 50% of urban growth has occurred in cities of less than 100,000 people [91]. The case of Zimbabwe is no exception to the regional trends. The demographic data provide insights into the dramatic economic downturn and its impact on urbanisation and migration patterns. Figures from the last inter-censal period (2002–2012) show negative growth in the largest cities: the Harare agglomeration, Bulawayo, Mutare, Gweru and KweKwe. It is significant that during the same period, the smallest urban centres saw a rise in the percentage of inhabitants facing economic hardship. This suggests that urban livelihoods in larger centres may be less resilient than those in smaller urban centres [5]. In Zimbabwe, urban growth is clearly driven by small and medium cities: while Harare presents 1.9% of the average annual growth rate, cities with 500,000 to 1 million inhabitants and cities with less than 300,000 inhabitants showed a 1.7 and 2.4% annual increase, respectively, between 2020 and 2030 [92]. In 2020, about 3 million people lived in cities with fewer than 300,000 inhabitants and about 2.5 million lived in larger cities. By 2030, 4 million people will be living in cities with fewer than 300,000 inhabitants compared to 3 million in larger cities [92].

Dynamic migration patterns, in particular circular migration, are associated with urbanisation trends. Zimbabwe recorded the highest rate of internal migration in the world in the last inter-censal period and patterns are now less predictable, partly because the Zimbabwean economy has contracted [93]. In 2012, 23% of the population stated that they had lived in a different district 10 years earlier [94]. The spatial patterns observed in the 2002–2012 period show that migration from rural to urban areas was similar to migration from urban to rural areas (around 500,000 people). However, the dominant pattern involves migration from rural-to-rural areas (more than 600,000 people) (see Figure 2), i.e., most internal migration comes from and is directed to rural areas, thus, it fuels bottom-up urbanisation. Given that the definition of “urban” varies across countries, there is no consensus on the definition of “small and medium cities”—alternatively “small and medium sized towns” [12,63]. The Zimbabwean classification defines small and medium cities as urban centres with less than 100,000 inhabitants. Net migration by urban type during the last two inter-censal periods points to a significant decrease in Harare and large cities, with levels below 3% in 2012. This contrasts with the strong increase in net migration rates in “municipalities” and “town councils” (see Figure 3). In fact, the proportion of migrants is highest in small and medium cities, where they make up 43% of the population [94].

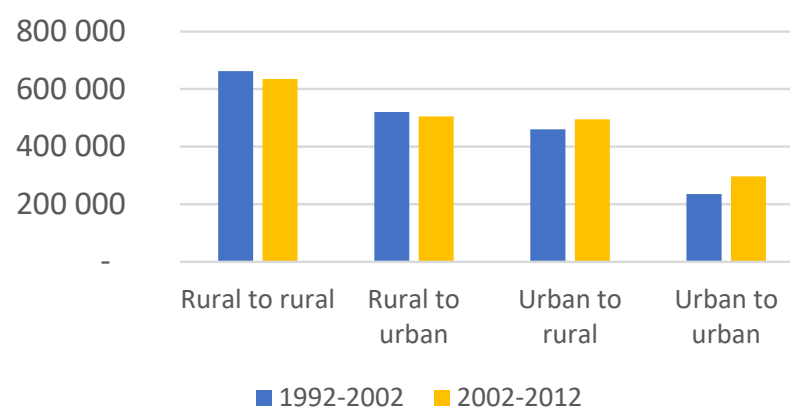


Figure 2. Rural to urban and urban to rural migration patterns in Zimbabwe, 1992–2002 and 2002–2012. Source: World Bank 2019.

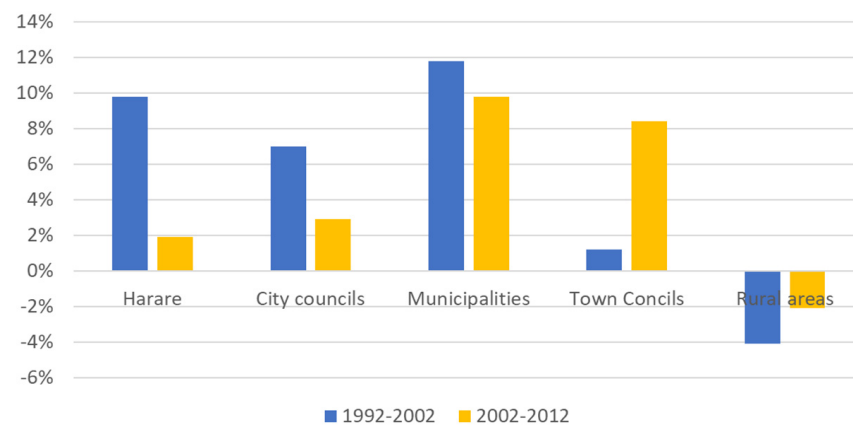


Figure 3. Net migration (% of population that moved in minus % of people who left) by urban type in 1992–2002 and 2002–2012. Source: World Bank 2019.

3.2. General Posture for Capturing Rural-Urban Linkages

The connectedness between rural areas and urban centres has usually been achieved either from the standpoint of an urban centre and its immediate rural surroundings, or from the perspective of rural locations and people. As Cattaneo (2021) did, we sought to apply a broader development approach by adopting a novel position. Our method to assess rural-urban linkages and their contribution to territorial development is grounded in the urban-rural continuum, as a dynamic multi-scalar settlement system that is produced by social and economic relationships within and between places. Our approach involved two major steps. First, we characterised the connectedness between rural areas and urban centres from the standpoint of rural areas. To account for context specificity, we used disaggregated analysis and infra-territorial data, i.e., district level, covering the whole country. We also considered the place occupied by rural areas in the urban hierarchy, including their connection with small and medium-sized cities. Assuming that the drivers of rural-urban linkages are the most suitable proxies for setting the type, direction and strength of rural-urban linkages (see Section 2.3), we can assess the multidimensional nature of rural-urban linkages. According to data collection, a factorial analysis enables us to identify the main features that differentiate the districts [95]. Second, we set out to build a typology of rural districts, based on variables that serve as proxies for the type, direction and intensity of the rural-urban linkages operating from each rural district. This provides a national overview of the diversity of rural-urban linkages in a country and of territorial imbalances.

3.3. Applying the Method in Zimbabwe

In Zimbabwe, there is little or no specific data on flows of people, money, information, goods and services between rural and urban areas at subnational level. The situation is similar in many sub-Saharan countries. Based on the premise that rural-urban linkages depend on the multidimensional features of rural areas and their relation to cities of different sizes, we established proxy indicators for the rural-urban flows, using available information at the district level, and building a corresponding typology of districts.

The first step in our method was to convert territorial features into different indicators, for which information was available at the rural district level in Zimbabwe. Then, by drawing on various scattered sources, mainly secondary data (population census reports, reports on the production and marketing of agricultural products, official websites, etc.), we filled in the indicators, which were identified to provide information about the drivers of rural-urban linkages for each of the 60 rural districts in our study (see Appendices A and B for source and data presentation). Given the diversity of the selected variables (qualitative, quantitative), we applied a Factor Analysis for Mixed Data (FAMD).

This method is useful because it offers information about the differences between districts' features, allowing us to select variables with higher levels of contribution. Once the differences between the table of observations and the theoretical table of total independence are established, the method's matrix formulae distribute the differences between two districts for a given modality, relative to the total of districts. The inertia, which is close to the variance, is thus assigned by successive steps on the basis of their complementarity and overlap. Given that the axes describe a decreasing dispersion of variables, the first two are the most relevant to the heterogeneity between districts (Table 1).

Table 1. Distribution of inertia per axis and related eigenvalues.

Axis	% of Inertia (%)	Cumulative Inertia %	Eigenvalue by Axis
1	27.05	27.05	3.79
2	21.77	48.82	3.05
3	12.94	61.76	1.81
4	9.27	71.04	1.30
5	6.80	77.83	0.95

From there, we selected active variables for each axis, using the rule of eigenvalue > 1 per axis (only the first four axes). The distribution accounts for 14 active variables (Table 2). See Appendix C for the correlation circle for quantitative and qualitative variables.

Table 2. Identification of active variables.

		1	2	3	4
1	Population density	7.35	11.70	0.05	3.70
2	Number of small and medium cities less than 2 h away	10.70	1.08	3.06	13.68
3	Travelling time to the capital city in minutes	9.52	7.36	13.54	0.37
4	Electrification	15.44	0.47	0.68	0.90
5	Travelling time to nearest large city (300,000 inhab) in minutes	14.23	2.96	0.28	1.97
6	Mining and construction (% of households involved)	4.65	5.08	0.09	14.41
7	Community land farmers share in district households	1.09	4.23	2.34	38.49
8	Share of district households involved in services	6.79	8.96	17.07	1.44
9	Share of district households involved in transport	14.33	2.41	0.44	1.71
10	Share of district households involved in manufacturing	5.79	1.60	24.23	11.20
11	Inter-census net migration rate	0.40	23.58	1.21	0.91
12	Interprovincial net migration rate	0.21	21.83	11.46	0.19
13	Share of A2 farm type per inhabitant	0.28	8.00	23.18	7.47
14	Type of maize value chain	9.22	0.73	2.38	3.56

On the basis of the FAMD results, the second step was to perform a Hierarchical Clustering on Principal Components (HCPC) in order to group rural districts into homogeneous groups. The method builds on the assumption that proximity matters for rural-urban linkages. In other words, most rural-urban linkages for a given rural district are determined by flows between the district and nearby urban centres. This is covered by the first axis of FAMD, which deals with what the population can do regarding infrastructure and structure of activity. However, other flows related to more distant urban centres are also considered in relation to population and mobility (second axis).

With the HCPC method, the distribution of districts involves a comparison of their similarities and differences in relation to the variables introduced by considering successive combinations of districts. This makes it possible to set the relevant number of clusters. This

method avoids postulating with regard to any initial functional relationship between the elementary variables and the socioeconomic district outcome. As a result, district outcome is perceived as a continuum. The HCPC ultimately established three relevant clusters, each of which associates a profile of urban-rural linkages with a given level of district characteristics. Within each cluster, the HCPC also indicates the characteristics of both axes, whose variables are most likely to enter into a development process (see Appendix D: the factor map of districts based on FAMD results, and the individual profiles of districts under the influence of active variables).

In addition to variables used as proxies of drivers of rural-urban linkages, we also characterise each district type with variables, such as poverty prevalence, Gini index, Food Insecurity and corruption index. This provides a general indication of the outcomes of rural-urban linkages in terms of the socioeconomic levels in each district and allows for comparison.

The typology and results have some limitations, which should not be overlooked. The first and most important limitation is the lack of proxy information about major drivers of rural-urban linkages, which could not be considered in the analysis. For example, political governance at district level, social networks, etc., may significantly influence the dynamics of rural-urban linkages in some districts [96]. To improve the typology output, additional information focusing on local governance and the main functional linkages with small and medium cities is required (see Section 5.2). The second shortfall is that a limited selection of 14 indicators was considered to ensure a consistent statistical output [97]. Given these limitations, we have enhanced the typology by reintroducing additional variables, namely, the other 11 indicators used to characterise districts.

4. Results: A Typology of Rural Districts According to the Multidimensional Drivers of Rural Urban Linkages in Zimbabwe

The three contrasted types of district presented below provide stylised facts about the potential nature of rural-urban linkages and their effects on territorial development in Zimbabwe (Tables 3 and 4).

Table 3. Characterisation of clusters obtained after FAMD and clustering.

Drivers of Rural-urban Linkages	Variables Used at the District Level (14)	Type 1 <i>n</i> = 28	Type 2 <i>n</i> = 12	Type 3 <i>n</i> = 20	Mean	Sd
Position of rural district in the urban hierarchy	1. Travelling time to the capital city (minutes)	264	* 365	* 162	250	119.2
	2. Travelling time to nearest large city (>300,000 inhabitants) (minutes)	* 189	202	* 90	159	88.2
	3. Number of small and medium cities less than 2 h away	* 1.4	1.4	* 3.1	2.0	1.4
Demographic features of the rural district	4. Population density (inhab/km ²)	28	12.95	* 41	29	17.1
	5. Inter-censal net migration rate/inhabitant	* 1.7×10^{-7}	* 8.2×10^{-7}	-6.8×10^{-8}	5.8×10^{-8}	5.2×10^{-7}
	6. Interprovincial net migration rate/habitant	* 3.3×10^{-7}	* 5×10^{-7}	-2.3×10^{-7}	-1.3×10^{-7}	4.9×10^{-7}
International migration	Average international remittances received by household (last 12 months/US\$)	1247	1610	1593	1435	1032.5
Natural resources in the rural district Type of natural agroecological region (% of districts in a NR)	NR I: >1000 mm annual rainfall, relatively low temperatures	0	0	* 15	5	-
	NR II: 700–1050 mm. Summer rainfall only	* 11	9	* 55	25	-
	NR III: 500–800. Relatively high temperatures and infrequent, heavy rain, seasonal droughts and severe mid-season dry spells	36	16	15	25	-
	NR IV: 450–650 mm annual rainfall, frequent seasonal droughts and severe dry spells during the rainy season	39	50	* 15	33	-
	NR V: <450 mm rain with very erratic rainfall. Northern low veldt may have more rain but topography and soils are poor	14	25	* 0	12	-

Table 3. Cont.

Drivers of Rural-urban Linkages	Variables Used at the District Level (14)	Type 1 n = 28	Type 2 n = 12	Type 3 n = 20	Mean	Sd
Productive orientation of the rural district—agricultural sector	7- Proportion of communal farms (% of households in the district)	* 45	* 30	40	41	0.15
	Proportion of A1 farm type/inhabitant.	0.23	* 0.50	0.20	0.28	0.002
	8- Proportion of A2 farm type/inhabitant	0.17	* 0.30	0.18	0.21	0.002
	9- Large-scale farm investment (% of districts with no large-scale investments)	100	100	75	92	-
	10- Type of maize value chain (% of districts with local value chain)	* 89	75	* 20	63	-
	Maize surplus (% of districts with a major deficit in maize product)	36	* 67	* 5	30	-
	Tobacco production (kg per inhab)	20.7	* 1.1	* 38.7	22.8	-
Productive orientation of the rural district—non-agricultural sector	11- Mining and construction (% of households involved)	* 3.9	* 10.8	6.8	6.2	0.05
	12- Services (% of households involved)	* 6.2	* 14.6	11	9.5	0.05
	13- Transport (% of households involved)	* 0.7	1.1	* 13	0.9	0.004
	Manufacturing (% of households involved)	* 0.8	1.4	* 1.5	1.2	0.007
Infrastructure	Number of food markets/district	8.5	* 6.9	* 10.4	8.8	3.1
	14- Electrification (% of households)	* 11.8	20.3	* 28	18.8	0.1
	Number of secondary and tertiary schools/number of 15–24-year olds	0.013	0.015	0.013	0.013	0.006

N.B: * indicates significant variables, if *p*-value < 0.05).

We draw on this characterisation of district types to build three contrasted situations of rural-urban linkages. The situations vary in terms of types of flows, their direction and density and their potential to foster territorial development (Table 4). Some districts are a long way from all types of urban centres (type 2) and, therefore, are not very conducive to positive rural-urban linkages. In these districts, rural-urban linkages are usually linked to the family farming sector and their virtuous contribution to poverty reduction is limited. On the contrary, districts that are close to all types of urban centres, including small or medium cities, offer broad features (favourable or mixed) for virtuous rural-urban linkages, which are based on commercial farming, trade and services (type 3). Between the two, there are other district types, which display mixed features and are close to a few small and medium cities. Their local economies are diversified, but primary activities, as well as mining and quarrying prevail. Here, rural-urban linkages may have moderate virtuous effects (type 1). Figure 4 displays the spatial distribution of the three types of districts and potential rural-urban linkages in Zimbabwe.

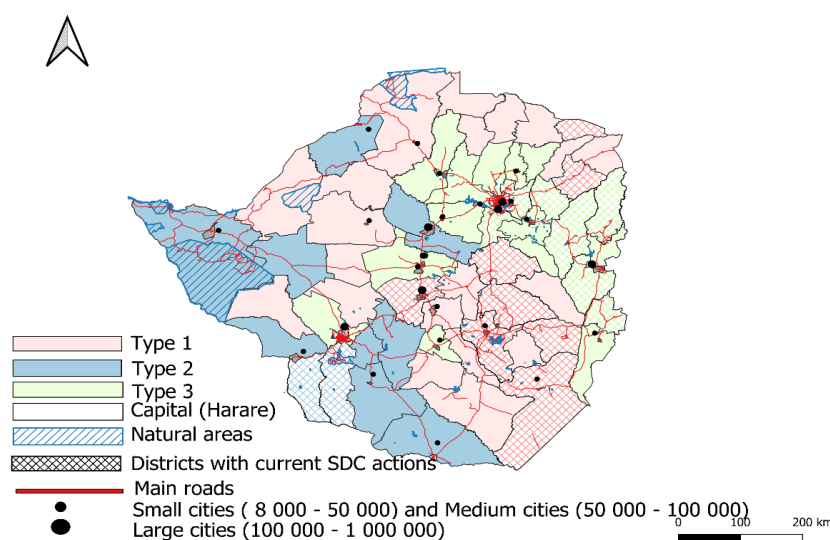


Figure 4. Types of rural districts according to potential rural-urban linkages in Zimbabwe.

Table 4. Characterisation of the different types of districts in Zimbabwe, associated rural-urban linkages and their possible contribution to territorial development.

TYPE 1: districts where rural-urban linkages make a limited contribution

Rural district with broadly unfavourable characteristics: rather undiversified economies based on smallholder farming, weak infrastructure (little access to electricity and roads), medium-low agroecological potential (Natural region III—semi-intensive to semi-extensive farming—& IV—semi-extensive farming), low density of small and medium-sized towns (1–2) and located far from capital or large cities (3 h).

Moderate rural-urban linkages largely dependent on family farming sector:

- Important flows mediated by household outmigration with cash/in kind remittances: urban to rural flows of money, goods and services, intermittent rural to urban food remittances
 - Limited rural-urban linkages mediated by agricultural markets:
 - Role of communal smallholder areas and farmer resettlement has increased. New commodity chains or channels have emerged, linking resettled farmers and nearby small cities (e.g., Gutu, Chatsworth)
 - Few rural to urban flows of staple crops to national value chains, some export crops for national consumption and export (e.g., tobacco)
 - Urban to rural flows of money, inputs for small to medium-scale agriculture
 - Few local upstream or downstream added-value activities, mostly cash crop production (for direct export)
- Rural-urban linkages probably make a limited virtuous contribution to territorial development—some support for food security and little or no support for economic activities
-

TYPE 2: districts where rural-urban linkages make some contributions

Rural districts with mixed characteristics: more diversified districts specialised in mining and/or services, with some commercial farming, average access to roads and electricity, but low agroecological potential (natural regions IV and V: less than 650 mm average annual rainfall, semi-extensive farming); there is a major grain deficit, some connections with a few small and medium-sized cities (one or two), quite near to large cities (e.g., Bulawayo), but quite far from the capital (between 3.5 to 6 h travelling distance).

Limited rural-urban linkages mostly supported by mining activities and services, with some commercial agriculture

- Some flows mediated by people who migrate to work in mining and service sectors (diverse petty trade or jobs linked to mining)
 - Large-scale platinum mining investments: not labour-intensive and benefits not retained locally
 - More small-scale artisanal mining: labour intensive, local upstream/downstream activities
 - Presence of A1-A2 farms: semi-extensive farming to supply limited local markets
 - More inflows of food and products from other urban and rural areas
- Rural-urban linkages provide few virtuous contributions to territorial development
-

TYPE 3: districts where rural-urban linkages make a major contribution

Rural district with broadly favourable characteristics: districts with the most diversified economies, commercial agriculture (natural regions I & II with more than 750 mm average annual rainfall—much more diversified farming and intensive farming region), grain surplus, transport and services developed, good infrastructure and good accessibility to all types of urban areas, high density of small and medium cities (three or more).

Dynamic rural-urban linkages mostly mediated by markets:

- Rely on small-, medium- and large-scale agriculture, transport sectors
 - Strong rural-urban linkages related to A1 and A2 commercial agriculture for more structured national value-chains, including supply to small and medium towns (e.g., Mvurwi)
 - Rural to urban flows of products, income, some upstream/downstream activities
 - Urban to rural flows of farm inputs and services, other goods and services
 - Weak rural-urban linkages related to export of cash crops (e.g., tobacco)
 - Some rural-urban linkages related to transport service markets (other than agriculture)
- Rural-urban linkages are likely to make a virtuous contribution to territorial development
-

The findings in Zimbabwe show how rural-urban linkages affect territories in different ways. They may optimise new market linkages, by combining more commercial agricultural production with off-farm incomes, but this depends on the dominant drivers and is not always the case. Positive linkages generally share one key factor: the added value produced through linkages may be retained and reinvested locally. Developing these flows may create more sustainable value-adding activities in strategic sectors, which will support dynamic territories. This method for assessing rural-urban linkages at a national level could be useful for strategic thinking (see Section 5.3).

5. Discussion

The aim of this research is to design and test a method to assess rural-urban linkages associated with diverse cities and their potential contribution to territorial development in southern countries—specifically Zimbabwe. Accordingly, we first discuss the relevance and limitations of our method and conceptual framework with regard to similar works. Second, we set out to explore what the results obtained in Zimbabwe (see Section 4) tell us about entry points for action or policymaking to encourage territorial development.

5.1. Relevance of the Method

Most research on rural-urban linkages has focused on high income countries and on the urban drivers and benefits, which generate more tangible or measurable outcomes (see Section 2). We set out to enrich this important field of research, by examining situations in the Global South and considering the rural end of the continuum as the entry point for setting up mutual interactions with cities.

The method allowed us to construct a national typology of rural districts as a function of the likely nature of the rural-urban linkages to diverse agglomerations, particularly small and medium-sized cities. We used two categories of variables/index: (i) variables featuring the connectedness of each rural district within the urban hierarchy (through travel time to different categories of cities); (ii) variables that characterise the drivers of rural-urban linkages from the standpoint of rural areas. We argue that this assessment method is helpful for grasping the local specificity and complexity of rural-urban linkages in the diagnostic phase of integrated territorial approaches. This is possible because we adopted three original postures.

First, we adopted a comprehensive conceptual position to consider the multidimensional drivers that determine the rural linkages along the rural-urban continuum, over and above economic features and distance. This method improves our understanding of people's lives in rural areas in southern countries, where the majority of the population lives. It also sheds light on the opportunities provided by the linkages in these rural areas, which support bottom-up urbanisation. So far, there is scarce research that takes a rural stand to grasp rural-urban linkages, often with a limited set of drivers.

A second core aspect of our positioning helps bridge the knowledge gap regarding how small and medium cities and nearby rural locations are connected to the broader urban system [76]. We propose a framework, based on proximity to cities of different sizes, in which rural locations are featured in terms of access to services or activities provided by one or more urban centres of reference. This is very different from the URCA's approach, which was inspired by the Central Place Theory [54] and its principle of primacy regarding larger urban centres. In sum, the URCA's overlook the relationship that rural areas have with polycentric urban systems. In these territories, the population, services and employment are not concentrated in a single centre. Instead, there are two or more urban centres, which have a functional role in terms of organizing the surrounding territory [98]. The typology in Zimbabwe reveals three types of rural districts that differ with regard to their integration within the urban hierarchy. Rural districts belonging to type 3 are better connected to the national urban hierarchy because they have the highest number of nearby small and medium cities, and they are the closest to large cities and the metropolitan area. Conversely, district types 1 and 2 have some similarities. They are less well connected, relatively, within

the national urban frame. Their productive orientation may play a significant role as drivers of rural-urban linkages. Type 1 districts have an agricultural-oriented base compared to type 2 districts, where economic diversification is more advanced. As a result, depending on the type of connections linking them to diverse urban centres, their rural-urban linkages may follow a different logic.

Third, unlike monographies or FEA approaches to rural-urban linkages, which usually produce a detailed analysis of one or several SMCs and their linkages to their more or less distant hinterlands (e.g., [46,76,86,99]), our frame can identify the main features of rural areas and the corresponding rural-urban linkages for the entire country. This is an advantage and makes it possible to identify the development dynamics beyond district boundaries, as well as a general country profile. For instance, type 3 rural districts, with a high density of small and medium cities and dynamic rural-urban linkages, form a circle around the capital, Harare (see Figure 3). This may result from historical urbanisation and development patterns, which were biased in favour of the capital city and the surrounding area. This dynamic may reflect a continued active path dependency. A national-scale analysis may reveal territorial imbalances and, therefore, encourage discussion about geographical and thematic issues and national public policy trade-offs—which monographies do not allow. In sum, the method could be useful for the diagnostic phase of integrated territorial development since it involves a national approach to rural-urban linkages. Simultaneously, it provides key orientations to examine the local specificity of rural-urban linkages in relation to the territories identified. The purpose is to offer an option to territorial development projects or actors that do not have well-established approaches to inform rural-urban linkages (e.g., SAM, FEA). In this respect, our approach could be part of a toolbox that provides information on rural-urban linkages to help territorial development projects or actors frame their objectives in the diagnostic stage.

We used multivariate analysis on selected variables to identify the most significant drivers of rural-urban linkages, which explain the differences between district types. A multivariate method structures and summarises data according to principal components, based on the principle of maximising variance between individuals (districts, in our case) [100]. In this way, MVA complements mapping methods (which are based on overlapping and interpreting different layers of variables). It is also more robust and precise.

5.2. Limitations and Perspectives for Research

This methodological initiative presents weaknesses which could be improved with further research. First, there is tension between the chosen units of analysis. Our conceptual approach considers territories as the research unit (see Section 3.3), while our operational system uses districts as the unit of analysis—because it is the best level in terms of available disaggregated information. Therefore, the rural districts can be matched empirically with one or more specific nearby cities—but it is not possible to map the diverse multi-scalar territories that are joined to each rural district. This kind of empirical endeavour would involve a national SAM, which is challenging in terms of available data. Another alternative could be the use of national health survey to set linkages with distant urban centres. Given this limitation, our method lacks a further key indicator, namely the relationship between urban centres and territorial development dynamics. These are based on the functions that the city provides to rural locations, and vice versa. These functions can be, for instance, (i) specialised goods and services; (ii) social, economic and cultural interaction; (iii) links to infrastructure networks connecting local communities with regional, national, and international communities; and (iv) public and government administrative services for channelling local demands [101]. As a result, at this stage, the present method “only” allows us to identify the dominant types of rural-urban linkages, which can support territorial development in the district, but not in a wider territory.

A second related point is that although the method provides information about different types of rural-urban linkages (nature, intensity and direction), it tells us little about the social relations that ground the interactions or the institutions that govern them. Typically, socioeconomic networks, social capital and governance dimensions—referred to as core drivers in the conceptual framework—would improve our understanding of the processes involved in the successful linkages in rural territories. Integrating the various institutional dimensions would be helpful. This brings us back to the challenge we face in terms of the information available at district level regarding intangible drivers of rural-urban linkages. Hence, our approach should be considered as a first step to select a specific context and narrow down development actions. Complementary methods could then be adopted to provide information on local dynamics related to selected districts—typically those mobilised in monographic approaches. Thus, the methods would involve integrating a two-stage approach: (i) building a national typology of districts according to an assessment of rural-urban linkages based on our approach and in line with specific policy or development programme objectives; (ii) conducting a more in-depth analysis of targeted districts, using a monographic approach to address aspects of governance.

Lastly, unlike some initiatives (e.g., [80]), our conceptual framework remains static. It offers a snapshot of the status of rural-urban linkages in different types of districts. This typology may evolve at different rates. Consequently, its application should be limited to the preliminary diagnosis phase of the territorial approach. Place-based diagnoses can then be used as a baseline for strategic thinking in order to determine actions and build a common understanding of national and territorial issues.

5.3. Entry Points for Strategic Thinking: Rural-Urban Linkages for Territorial Development in Zimbabwe

As mentioned above, one of the contributions of this work is to identify different types of rural-urban linkages and territories on a national scale. This allows us to suggest strategic entry points for sustainable territorial development action. This section makes a series of propositions for Zimbabwe, which have been considered in the SDC regional strategy 2023–2026 to help identify areas of intervention and orient current or future actions in specific territories [88].

5.3.1. Supporting the Development of Local Food Systems

Overall, there are low levels of added value in Zimbabwe's food economy. However, the densification of rural-urban linkages, through agricultural market linkages, represents a good opportunity for territorial development, especially in terms of job creation in downstream activities. Given the economic importance of the food economy—a term that encompasses farming, upstream activities (equipment and input provision, and extension, information, training, and maintenance services, etc.) and downstream activities (food processing, packaging, transportation, wholesaling, retailing, catering, waste management)—now and in the foreseeable future, one possible strategy to maintain and/or create added value locally could be to develop more inclusive and sustainable local food systems, based on rural-urban synergies. Besides increasing production, there are other ways to create added value in food systems. Two methods are fairly accessible, which makes them of particular interest: food processing and improving the quality of processed food products, and recycling agricultural residues (for animal feed or energy production). This fortifies ties between urban consumers and rural producers, with the expansion of specific food markets in urban areas (farmers' and municipal markets, public procurement).

However, the options for improving rural-urban linkages in the local food system may differ depending on the structure and organisation of value chains and the level of integration into the nearest urban markets. Indeed, in Zimbabwe, the typology of rural-urban linkages suggests that some duality is likely to continue. Some rural districts may have poorly structured agricultural value chains, which are not well-integrated into dynamic urban markets. In contrast, some districts may have quite dynamic local value

chains connected to a variety of urban centres. In areas with poorly structured value chains, the priority may be to improve agricultural production (regularity, quantity and quality) and market infrastructure in order to develop more efficient and diverse market channels. In rural areas and in small and medium cities, developing basic infrastructure (e.g., public marketplaces, public/private grain storage facilities), could reduce post-harvest losses. In districts with more structured value chains and basic infrastructure, additional initiatives may help improve rural-urban linkages, for example, food processing and recycling, as well as a strengthening tie with urban consumers in small and medium towns.

In Zimbabwe, as in many SSA countries, the industrialisation of the food sector has been limited to a handful of corporate businesses which process export-oriented cash crops (such as cotton or tobacco) and imported agricultural commodities (milling industries or breweries, for example). The local-to-local food economy is dominated by small-scale food processing and catering activities in urban areas. This type of food processing is labour-intensive and enables many young family members to enter the labour market and contribute to household livelihoods. It is a way to sustain virtuous rural-urban linkages. However, small-scale food processing units face specific constraints because of the atomisation of food production, and access to credit and/or technology for improving product quality. In addition, there are no collective organisations to facilitate dialogue with public authorities and to help them gain recognition.

Recycling agricultural residues can limit post-harvest losses and generate added value. First, rural producers could use diverse sub-products (rice bran, groundnut leaves, soybean cakes) for animal feed to supply rural and urban markets, e.g., small-scale animal fattening in urban and peri-urban areas. Agricultural residues can also be used to produce energy for productive activities (such as small-scale food processing) in rural areas and small and medium cities. In many areas in Zimbabwe, energy is supplied by autonomous internal combustion engine-based systems, photovoltaic or thermal solar networks and, to a lesser extent, by electricity from the national grid. In the case of autonomous fossil fuel-based systems, the fuel supply is expensive and irregular due to shortages of imported petroleum products at ports, problems transporting fuel to rural areas, and final energy cost. The energy provided by photovoltaic systems is not compatible with semi-industrial or industrial activities because power output is sporadic and too low. The national electric power grid is subject to recurrent power outages because capitals and main cities are given priority. These factors limit the expansion of small and medium cities in the food-processing sector in rural areas and small and medium cities, forcing them to relocate to main cities.

Strengthening ties with urban consumers in small and medium cities is another point. Urban diets are changing, which represents an opportunity to create more added value in local or regional food systems [102]. There is a risk that changing diets will be influenced by the huge diffusion of highly processed products from international brands. The phenomenon often comes with the development of supermarkets [103]. Processed products have adverse effects on consumer health (because of their high fat and sugar content and low nutritional quality). Moreover, they do not create any added value at the local level. To counteract this trend, the use of local products with a high nutritional value should be encouraged. This could be achieved with communication to raise consumer awareness about local high-quality products and by developing quality labels. Local products could be promoted through mass public procurement for hospitals and schools (school feeding programmes) and incentives to supermarkets to reduce their dependence on long-distance supply chains.

The typology of districts based on rural-urban linkages reveals that linkages are important in the rural districts in Zimbabwe's mining regions. This is because the remittances sent from small mining cities to rural areas can be significant and help improve rural livelihoods. However, mining is an unstable activity, which depends on international commodity markets, and market fluctuations impact rural livelihoods. Supporting urban and peri-urban agriculture could help increase the resilience of rural populations that are dependent on mining. Urban agriculture involves the production of food crops and livestock in and

around urban areas. It is increasingly common in small and medium cities and plays an important role in livelihood resilience, particularly for vulnerable groups, such as women and young people [104]. Urban farmers face specific challenges, such as access to water and land. These difficulties could be alleviated with local government interventions. Urban authorities could help provide land and clean water, extension support and better access to markets for urban farm produce.

5.3.2. Improve the Impacts of Migration with Adequate Support for Migrants

This entry point aims to strengthen the rural-urban flows mediated by people migrating in order to harness more positive spill-over effects. Circular migration and multi-sited households are common. Therefore, a holistic approach is needed to reflect the fact that programmes implemented in urban areas will affect rural areas and vice versa.

Remittances can be important for households' livelihoods, particularly for survival strategies. Households usually use remittances to cover the costs of daily requirements (food, health, education or housing). However, actions to develop collective approaches could help optimise the use of these transfers between rural and urban areas (e.g., for productive use to create jobs). When high levels of international remittances are received in a community, co-development approaches could be explored. This is the case in some districts in Zimbabwe. For example: migrants and beneficiary households could be encouraged to use part of the funds to invest in community or private production projects, with co-funding from public and/or donor subsidies; migrants' associations could be organised; households and migrants could be taught financial skills. Existing global initiatives should be carefully examined and adapted to local contexts and institutions.

As with cash remittances, food remittance by migrants also has a role to play in urban and rural food security. However, little attention has been given to the remittance of goods, especially foodstuffs, across international boundaries and within countries. For example, in Africa "transfers of food are invisible in the sense that they run within the family and outside market channels" [9]. Given that cash and food remittances are core livelihood strategies, improving the conditions for securing cash and/or food remittances could help households. Avoiding the high cost of formal channels would be possible if services were tailored to meet the needs of the target population. Migration is not simply a matter of going from rural to urban areas. In Zimbabwe, rural to rural and urban to rural migration is increasing. These migrants generally have more capital resources than their non-migrant counterparts and are more involved in the input and output markets. Actions could support the settlement of migrants in rural districts and to encourage interactions within the host communities. Many migrants have agricultural knowledge or market links that could benefit the local population.

5.3.3. Making Mining More Profitable and Sustainable for Local Populations

This entry point aims to develop more profitable and sustainable mining activities. Mining attracts people and, thus, increases rural-urban linkages. However, we must distinguish between two types of mining activities, which imply different types of action.

The first type is industrial and located in or near cities of different sizes. Industrial mining activities attract workers and create local activity, which intensifies rural-urban linkages. However, most of the value generated by mining leaves the territory, which means that the rural-urban linkages are not so virtuous. If mining is to make a more positive contribution to local economies, public policies should work with mining companies to set up development programmes specifically for local populations. This could take the form of a joint project with the mining companies, including equitable and transparent contracts negotiated with the state.

The second type is small-scale mining, which has developed significantly in recent years. It contributes directly to local economies, but causes major environmental problems and puts workers at risk (poor working conditions). In order to develop the potential of rural-urban linkages in regions concerned by small-scale mining, miners could be taught better practices. This could reduce pollution and help preserve the local population's health. Fair trade mineral marketing channels could be set up to guarantee better pay, more stable incomes and improved working conditions for producers.

5.3.4. Capacity Building to Develop Territorial Approaches

Last, territorial governance is a key factor for improving rural-urban linkages. Local governments need support to help them manage emerging functional territories along the rural-urban continuum more effectively. Identifying local needs and local potential can facilitate the development of more bottom-up local solutions, involving the private sector (with possible public-private partnerships) and civil society organisations. Therefore, by investing in a territorial approach, public policies can be adapted to diverse local situations. This would create an adequate environment to enhance virtuous rural-urban linkages and bridge the gap between urban and rural resources. However, local governments often lack the necessary skills and sometimes the resources to implement territorial approaches. Therefore, a first step could involve capacity-building at local authority level (e.g., district or provincial officers and authorities governing small and medium cities), with a focus on "territorial development approaches". This could include future-based approaches, which are suitable for territorial development [105]. Post-Covid 19, food systems should be strengthened as part of a more localised territorial approach, adapted to local needs and conditions. This would increase resilience to different kinds of crises. A second step could be to help government representatives co-design a territorial development plan with local stakeholders.

6. Conclusions

Much of the literature on rural-urban linkages has focused on high-income countries and on urban drivers and benefits because they represent more tangible or measurable outcomes. This work contributes to the rising body of empirical research that seeks to examine this crucial field in the Global South. Our specific aim was to introduce and test an innovative method to assess rural-urban linkages and their role in territorial dynamics in an African country, characterised by a demographic context with strong rural densification and the expansion of small and medium-sized cities. To achieve this, we built on a comprehensive approach that conceptualises space as a rural-urban continuum, where multidimensional and multilevel drivers of rural-urban linkages and polycentric agglomeration dynamics craft territories. We also chose rural areas as the standpoint to set the interactions with cities.

Our original method draws on rural data available at district level to characterise the drivers of rural-urban linkages, which are used to produce proxies to assess the type, direction and strength of rural-urban linkages. We then propose a multivariate analysis and clustering to establish a typology of space according to flows between rural and urban areas and their potential role in territorial development. Applying our method in Zimbabwe, we identified three types of districts in terms of the dominant and context-specific rural-urban linkages, their intensity and potential to generate value.

The discussion underlines how this assessment method can help identify the local specificity and the complexity of rural-urban linkages during the diagnostic phase of integrated territorial development approaches. We reveal how small and medium cities and nearby rural locations are connected to the broader urban system. We also propose key areas for future research to improve the method, such as identifying the indicator for the functions that cities provide to rural locations or the social relations, which ground the interactions or institutions that govern rural-urban interactions. Thematic entry points are also discussed to strengthen rural-urban linkages with small and medium cities in the case

of Zimbabwe. They focus on potential actions to create an enabling environment, which would allow rural-urban linkages to enhance economic development.

The present initiative and corresponding recommendations for action should contribute to a global reflexion to move away from the prevailing sectorial and siloed planning and governance systems, which still characterise most policy frames. The feasibility of this method will strongly depend on the skills and resources mobilised for territorial approaches. Therefore, priority should be given to capacity-building, which focuses on “territorial development approaches” at the local level.

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Appendix A

Table A1. Metadata on Indicators in Zimbabwe.

Variables at District Level	Definitions and Sources
1. Travelling time to the capital city	Definition: travel time between rural district and the capital Source: Google Maps to assess travel time.
2. Travelling time to nearest large city (>300,000 inhabitants)	Definition: travel time between rural district and nearby large city (100,000–1,000,000). Source: World Bank (2019) report that classifies Zimbabwe’s urban centres by population size (2012) and use of city population website to identify nearby large cities, as well as Google Maps to assess travel time.
3. Number of small and medium cities less than 2 h away.	Definition: the number of small towns (8000–50,000) and medium towns (50,000–100,000) located less than 2 h from the rural districts. Source: World Bank (2019) report that classifies Zimbabwe’s urban centres by population size (2012) and use of city population website to identify nearby S&M, as well as Google Maps to assess the travel time.
4. Population density (inhab/km ²)	Definition: population per km ² Source: Zimstat(2012), ZIMBABWE Population Census report
5. Inter-censal net migration rate/inhabitant	Definition: we use “inter-censal net migration/inhabitant” as the ratio of inter-censal net migration over total population of the rural district. The “inter-provincial net migration per inhabitant” was calculated in the same way. Source: Zimstat(2012), ZIMBABWE Population Census report.
6. Inter-provincial net migration rate/inhabitant	Definition: the net migration rate is calculated by dividing the level of net migration (In–Out) by the population born in that province. This figure is then multiplied by 100 to produce the relative % change (positive or negative) from the original population born in the province. Source: Zimstat (2012), ZIMBABWE Population Census report.
7. Average international remittances	Definition: average international remittances received by households at provincial level, defined as transfers in cash between members of the same family, who are resident in different parts of the same country or in different countries. They are usually sent by a family member working in a foreign country for a year or more. Source: ILO (2017) Population, Income, Consumption Expenditure Survey (PICES) report
8. Natural agroecological region zoning	Definition: natural agroecological region where the rural district is located Source: Map available online: https://perspectives-cblacp.eu/natural-regions-in-zimbabwe/ (accessed on 28 September 2022)
9. Community land farms	Definition: community land farmers as a Percentage of Employed population Source: Zimstat (2012) Population Census Report.

Table A1. Cont.

Variables at District Level	Definitions and Sources
10. Family farms (A1) 11. Small-scale commercial farms (A2).	<p>Definition: we use A1 per capita and A2 per capita as the total number of farms (type A1 and A2) in the province over the population in the rural district [99].</p> <ul style="list-style-type: none"> - A1 farms generally cover 5 hectares in the farming regions I and II, with more arable production and higher rainfall. The size increases to 10 hectares in the drier regions (III, IV and V). - A2 farms are small-scale commercial farms ranging from 20 to 240 hectares. Although there is much variation, the average size of new A2 farms is 318 hectares, while that of A1 family farms is 37 hectares, including crop and grazing land (according to Scoones et al. (2011) “Zimbabwe’s Land Reform A summary of findings”). <p>Source: information is drawn from the 2003 Report of the presidential land review committee on the implementation of the fast-track land reform programme, 2000–2002 (‘The Utete Report’).</p>
12. Large-scale farm investment	<p>Definition: presence or absence of large-scale land investment in the district.</p> <p>Source: The Land Matrix, official website: https://landmatrix.org/observatory/africa (accessed on 28 September 2022))</p>
13. Type of maize value chain (national or local)	<p>Definition: refers to the nature of the maize value chain. If local production is for local markets, then the “maize value chain” is local. If local production feeds other markets from other districts/provinces, it is national.</p> <p>Source: information is taken from 2015 Zimbabwe Vulnerability Assessment Committee (ZimVAC 2015) and is based on Maize Grain Source Market (inside or outside district)</p>
14. Maize production status (Minor deficit/major deficit/surplus)	<p>The information drawn from the FEWS Network indicates the current situation in the district regarding maize production (see Production and Market Flow Maps, which provide a summary of experience-based knowledge of market networks that are significant for food security)</p>
15. Tobacco production	<p>Definition: we use provincial data and district population to compute production/inhabitant</p> <p>Source: Tobacco Industry and Marketing Board (2018) Annual report</p>
16. Mining and construction	<p>Definition: percent household employed in mining and construction.</p> <p>Source: ZimStat (2012) Population Census Report</p>
17. Services	<p>Definition: percent household employed in services</p> <p>Source: ZimStat (2012) Population Census Report</p>
18. Transport	<p>Definition: percent household employed in transport</p> <p>Source: ZimStat (2012) Population Census Report</p>
19. Manufacturing	<p>Definition: percent household employed in manufacturing</p> <p>Source: ZimStat (2012) Population Census Report</p>
20. Number of food markets/ district	<p>Definition: total number of markets in the rural district</p> <p>Source: Markets covered by Zimvac (2016) Assessment and Grain Marketing Boards</p>

Table A1. *Cont.*

Variables at District Level	Definitions and Sources
21. Electrification	Definition: percent distribution of households in dwelling units with electricity by district. Source: ZimStat (2012) Population Census Report
22. Number of schools above primary level	Definition: number of secondary schools in the province + number of universities in the province over total population aged 15–24. Source: Zimbabwe Ministry of Education’s official website (for secondary schools) and Google for the total number of universities in each province
23. Corruption index	Definition: assessment of government’s fight against corruption. Respondents were asked: how well or badly would you say the current government is handling the following matters, or have you not heard enough to say: Fighting corruption in government? Source: AFRO BAROMETRE (2015), Afrobarometer Dispatch No. 25
24. Gini index	Definition: the Gini index is a synthetic indicator of the level of inequality for a given variable; here we use the income level and population. It varies between 0 (perfect equality) and 1 (extreme inequality). Between 0 and 1, the higher the Gini index, the greater the inequality. Source: Zimstat (2015) Zimbabwe Poverty Atlas.
25. Food insecurity	Definition: the recurrence of food insecurity (2009–2013) was calculated in 2015. The key indicator used for the analysis was the recurrence of food insecurity among 20% or above of the population. The 20% threshold was set in order to represent 1 or more out of 5 households/people from the total district population as food insecure. Source: World Food Programme (2015) Integrated Context Analysis (ICA)
26. Poverty prevalence	Definition: the analysis compared the average consumption of an individual in a household to the national total consumption poverty line per capita. Then, Atlas used the Total Consumption Poverty Line (TCPL) or the upper income poverty line of US\$71.08, which was compared with the per capita consumption expenditure at household level. Poverty prevalence in the Atlas was expressed as a percentage; thus, ward-level ranking was based on the percent figures and not the number of poor households. Source: Zimstat (2015) Zimbabwe Poverty Atlas.

Appendix B

Table A2. The database structure.

Dimensions of Drivers of RUL	Variables at District Level	Type of Indicator	Description of the Indicator
1. Position of rural district in the urban hierarchy Indication of intensity of rural-urban linkages between rural district and different types of urban centres	1. Travelling time to the capital city	Numerical—Continuous.	Minutes
	2. Travelling time to nearest large city (>300,000 inhabitants)	Numerical—Continuous.	Minutes
	3. Number of small and medium cities less than 2 h away	Numerical—Discrete	Number

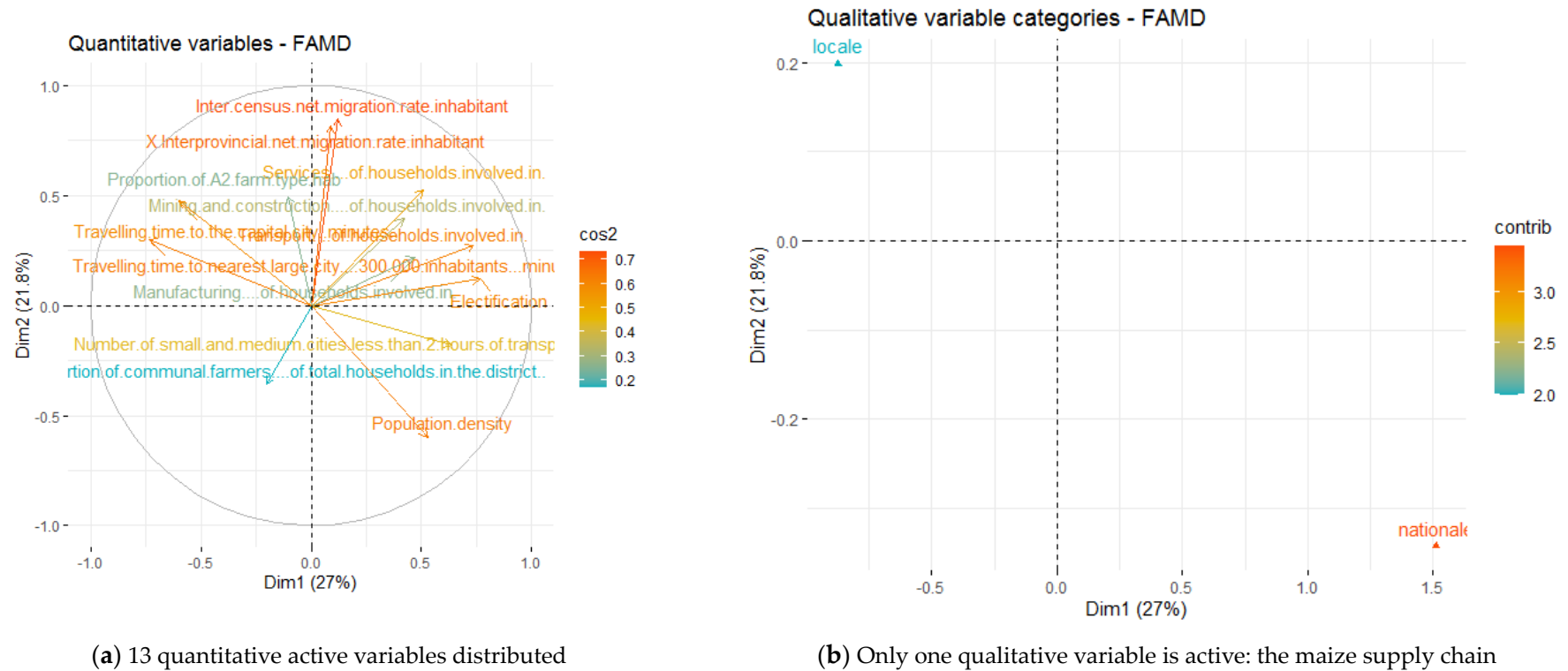
Table A2. Cont.

Dimensions of Drivers of RUL	Variables at District Level	Type of Indicator	Description of the Indicator
2. Demographic features of the rural district Population density may be related to pressure on local natural resources and a tendency for outmigration	4. Population density	Numerical—Ratio	District Inhab/km ²
	5. Inter-censal net migration rate/inhabitant.	Numerical—Ratio	Inter-censal net migration rate/district inhabitant
	6. Interprovincial net migration rate/inhabitant	Numerical—Ratio	Interprovincial net migration rate/district inhabitant
3. Average income from international migration Indication of flows of money to district	7. Average international remittances	Numerical—Continuous	Last 12 months /\$US (2012)
4. Natural resources endowment of the rural district Indication of the district's agricultural potential and attractiveness for household livelihoods	8. Natural agroecological region zoning	Categorical (5)—Ordinal	NAR I: Annual rainfall > 1000 mm relatively low temperatures NAR II: 7< rainfall < 1050, summer rainfall only NAR III: 500 < rainfall < 800. Relatively high temperatures and infrequent heavy rain, seasonal droughts and severe mid-season dry spells NAR IV: 450 < rainfall < 650. Frequent seasonal droughts, severe dry spells in the rainy season NAR V: Rainfall < 450, very erratic. Northern low veldt may have more rain, but soils are poor
5. Productive orientation of the rural district—agricultural sector Indication on farms: type, level of investment and intensity of the agricultural value chain linked to local or national markets	9. Community land farms	Numerical—Ratio	Community land farmers share in the total households in the district
	10. Family farms (A1) See definition in Appendix A	Numerical—Ratio	Share of A1 farm type/inhabitant
	11. Small-scale commercial farms (A2). See definition in Appendix A	Numerical—Ratio	Share of A2 farm type/inhabitant
	12. Large-scale farm investment	Categorical—Dichotomous	Yes: if there is large-scale farm investment No: if no large-scale farm investment
	13. Type of maize value chain	Categorical—Dichotomous	Local: the district's maize production is sold locally National: district's maize production is sold at national level
	14. Maize	Categorical (3)—Ordinal	Major deficit Minor deficit Surplus
	15. Tobacco production	Numerical—Continuous	Amount of tobacco produced per capita (Kg/inhabitant)
6. Productive orientation of the rural district—Non-agricultural sector	16. Mining and construction	Numerical—Ratio	% of district households involved in
	17. Services	Numerical—Ratio	% of district households involved in
	18. Transport	Numerical—Ratio	% of district households involved in
	19. Manufacturing	Numerical—Ratio	% of district households involved in

Table A2. Cont.

Dimensions of Drivers of RUL	Variables at District Level	Type of Indicator	Description of the Indicator
7. Infrastructure Indication of the volume of flows of agricultural products and indication of the area's economic potential and attractivity	20. Number of food markets/ district	Numerical—Discrete	Number
	21. Electrification	Numerical—Ratio	Share of households in dwelling units with electricity, by district
	22. Number of schools beyond primary level	Numerical—Discrete	Number of secondary and tertiary schools per inhabitant 15–24 years old
8. Quality of institutions	23. Corruption index	Categorical (3)—Ordinal	Low Medium High
9. Livelihoods indexes	24. Gini index	Numerical—Continuous	Number
	25. Food insecurity	Categorical (3)—Ordinal	Low Medium High
	26. Poverty prevalence	Numerical—Ratio	Percent of households with a consumption expenditure below the national threshold.
9. Dimensions	26 variables		38 modalities

Appendix C

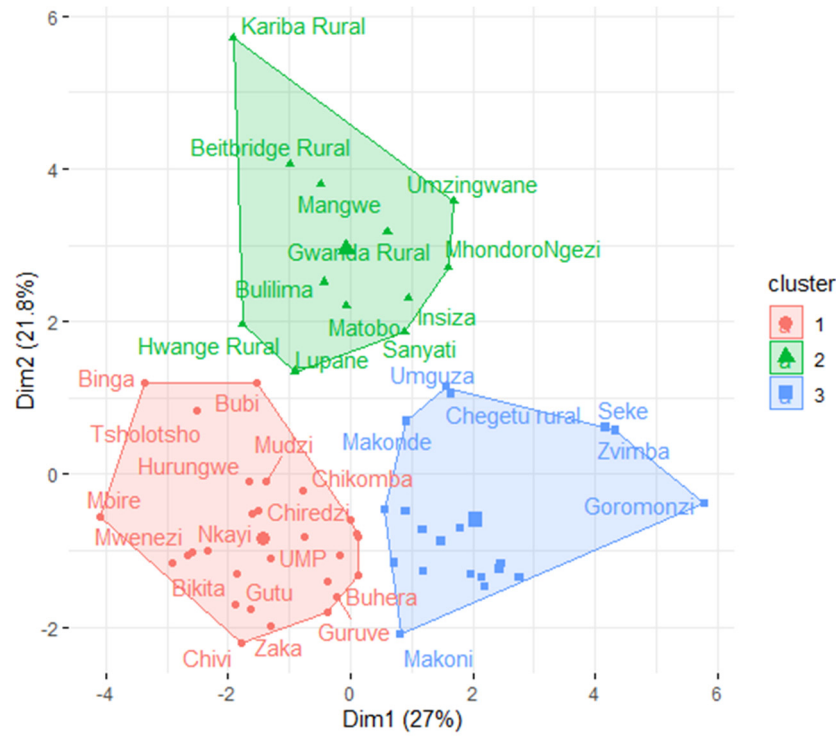


(a) 13 quantitative active variables distributed

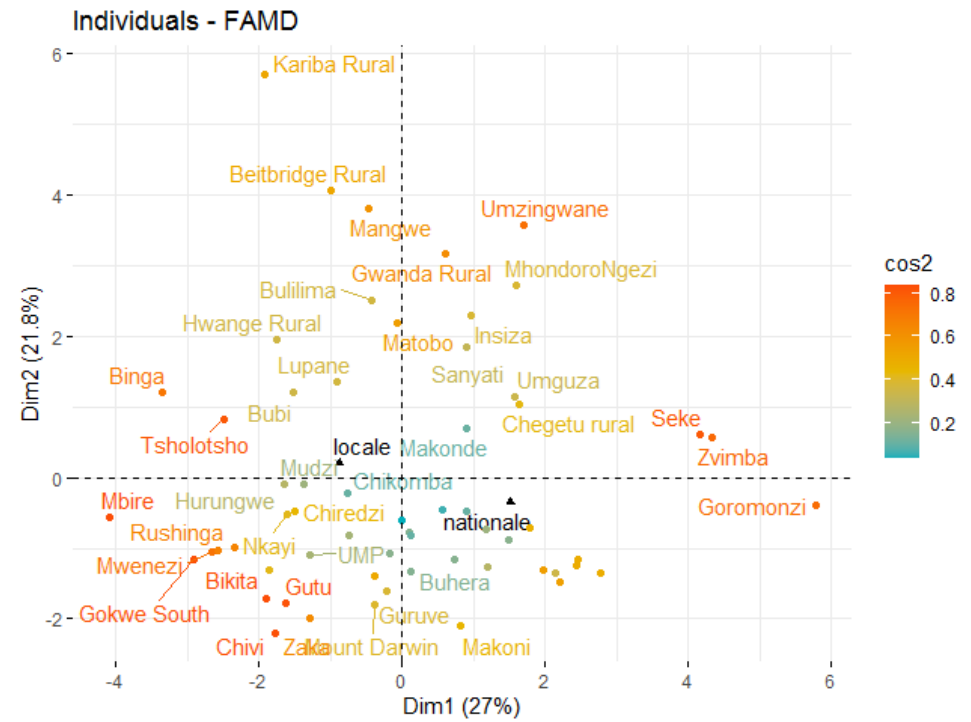
(b) Only one qualitative variable is active: the maize supply chain

Figure A1. The contribution of the 14 active variables of the FAMD.

Appendix D



(a) Factor map on district based on FAMD results



(b) Individual profiles of districts under the influence of active variables

Figure A2. Factor map of districts based on FAMD results (1); and individual profiles of districts under the influence of active variables (2).

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