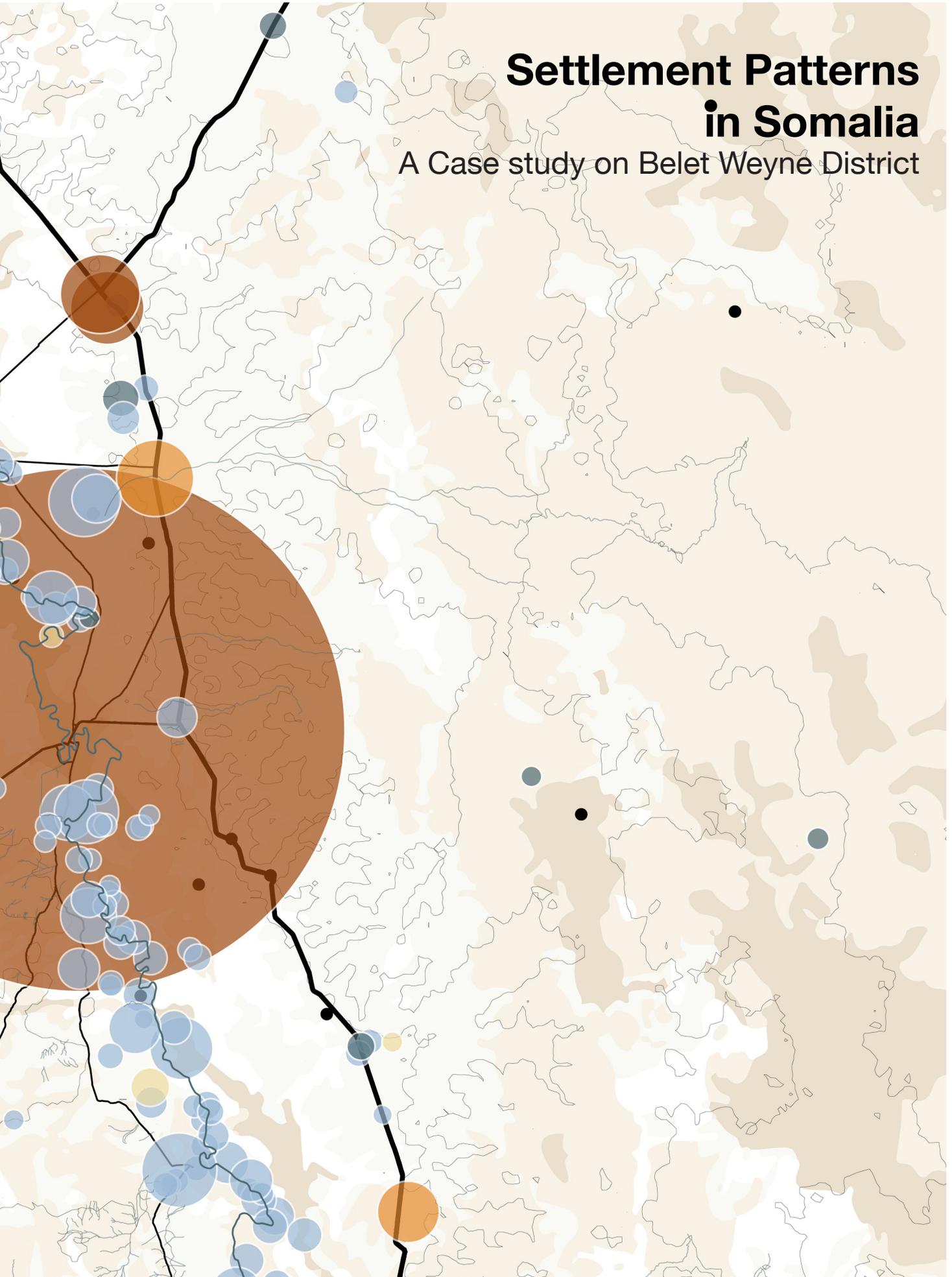


Settlement Patterns in Somalia

A Case study on Belet Weyne District



SETTLEMENT PATTERN IN SOMALIA
A Case study on Belet Weyne District

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1. INTRODUCTION

According to most statistics, Somalia is one of the few countries whose population still resides predominately in rural area,¹ although it is experiencing rapid urbanization, and projected to become predominately urban by 2050.²

Most policies, plans and programmes give much more attention to those aspects connected with the urban growth rather than to those concerning rural areas. This unbalanced interest can be explained by different converging factors, most notably the security challenges, which force government and international organizations to operate in a limited space often restricted to urban settlements, but also the widespread belief that cities are viewed as the uncontested engines of growth for an economy.

This is reflected in the cartographic representations of Somalia. Outside main cities, settlements are described as rural, with no regard to marked differences in population and population densities, land uses and land use change, infrastructure provision, livelihood strategies, social and economic structures.

The urban-rural dichotomy does not properly describe different forms of urban concentration and the rich spectrum in settlement types which constitute the system of territorial organization of Somalia, nor takes into account some of the features that the urban transition is taking place nowadays in the country. Moreover, the dichotomy rural-urban has limited value in a cultural context where historically residence was nomadic or seasonal and rarely coincided with social and economic space.

This study was developed to start a process of recognition of the complex reality that characterizes the Somali territorial system and a new conceptualization of urbanization trajectories in the country, which could be extended to the Horn of Africa Region.

It does so showing different possible visual representation of the 'blended' environments that fall outside the current definition of urban but cannot be fully described as rural, distinguishing several identified forms that can be categorized between the urban and the rural form.

In doing so, this study suggests an alternative reading of the territory and local and trans-local flows of people, goods, labour and capital, and emphasizes the agency of smaller settlements and the country system beyond the mechanisms of international aid, formal jurisdictions and competencies.

1 UNFPA, Population Estimation Survey Somalia 2014

2 UNDESA Population Division, "World Urbanization Prospects: Somalia," 2018. Available at: <https://population.un.org/wup/Country-Profiles/> [Accessed 17 February 2021]

2. WHAT IS URBAN?

2.1 Main issues within the international debate

There is no universal or harmonized method to delineate cities or urban agglomeration. While several global agendas (Global Monitoring Framework of the 2030 Agenda for Sustainable Development, New Urban Agenda, among others) have embedded in their monitoring and implementation the collection of several indicators for cities, urban and rural areas, data rely on national definitions.

These vary considerably, applying criteria related to settlement size, population density, economic activity, physical characteristics, level of infrastructure, or a combination of all.¹

In Africa, the most widely used criteria is administrative (25 countries), followed by mixed (15 countries) and numerical (13 countries, ranging from 1 500 to 30 000 inhabitants).²

Several attempts were undertaken to reach a global 'urban' definition, using physical and demographic criteria. The World Bank's Agglomeration Index identifies all settlements above a certain minimum population size and minimum population density that are within a certain travel time by road.³

Similarly, the Organisation for Economic Co-Operation and Development (OECD) uses a three

steps methodology: identifying contiguous or highly interconnected densely inhabited urban cores; grouping these into functional areas; and defining the commuting shed or 'hinterland' of the functional urban area.⁴

A more recent method is called the Degree of Urbanisation. This method classifies the entire territory of a country into three classes: 1) cities, 2) towns and semi-dense areas and 3) rural areas. It has two extensions. The first extension identifies: cities, towns, suburban or peri-urban areas, villages, dispersed rural areas and mostly uninhabited areas. The second extension adds a commuting zone around each city to create a functional urban area or metropolitan area.⁵ This method was endorsed on the 51st meeting of the UN Statistical Commission in March 2020.

Most of these methodologies rely on a huge bulk of data, and while global maps of population and built-up area are now available with increasing resolution, reliable commuting data only cover limited areas of the world. At the same time, these definitions are mostly aimed at reaching international statistical comparisons, and not necessarily describe in a satisfactory manner the contextual differences of every country. This is the case with density and size thresholds, which are helpful to reach a common understanding of urban areas, but fail to capture historical, cultural and political factors which may influence a local perception of human settlements.

To reach a more sophisticated and factual understanding of the territory, including spatial structures and relations, different methods should be applied which are necessarily country-specific.

2.2 Definition of "urban" in Somalia

In Somalia the State Planning Commission adopted a definition of town in its first and only census, in 1975. The definition was as follows:

1 UNDESA (2018), World Urbanization Prospects The 2018 Revision – Methodology, New York

2 Ibid

3 "Uchida, H; Nelson, A. 2009. Agglomeration Index : Towards a New Measure of Urban Concentration. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/9039> License: CC BY 3.0 IGO."

4 OECD (2012), Redefining "Urban": A New Way to Measure Metropolitan Areas, OECD Publishing, Paris, <https://doi.org/10.1787/9789264174108-en>.

5 European Commission, ILO, FAO, OECD, UN-Habitat, World Bank, A recommendation on the method to delineate cities, urban and rural areas for international statistical comparisons, 2020

- i. All regional and district headquarters are towns irrespective of their populations
- ii. All other places which have a population of 2000 or more.

At the time data was not available for other places with a population of 2000 or more other than the 68 district headquarter.⁶ From then, these district headquarters have been defined as “urban” leaving the rest of the settlements under the “rural” label, in this case only negatively as “non-urban” (or more precisely “non-district capital”).

In 2005, the United Nations Development Programme (UNDP) prepared a report entitled ‘Population Estimates and Projection for Somalia, 2005-2010 (draft)’ which included a master list of settlements. This was further expanded in 2008 including settlement point location data from different years and merging together information from NGOs and UN agencies working in Somalia, including UNDP, the German Agency for Technical Cooperation (GTZ), the Kenya Medical Research Institute (KEMRI), the Food Security Analysis Unit (FSAU), and the UN Office for the Coordination of Humanitarian Affairs (OCHA).⁷

This list was the base for the 2014 Population Estimate Survey of Somalia (PESS), carried out by UNFPA, the first comprehensive estimates on the Somali population in over four decades. The PESS, however, relied on the previous definition of urban and rural. Furthermore, it presented its results broken down to the pre-war regions, thus leaving broad uncertainty on the geographical details of its findings.

To date, the settlement layer endorsed by UNOCHA and used by UN in Somalia is the one prepared by the Somalia Information and mapping coordination (SIMAC) working Group.⁸ The dataset includes 9615 settlements locations divided in various categories: national capital (1); regional capital (17); district capital (57); town (11); part of town (202); settlement (9327). The layer, however, does not provide more in-detail information on these points, other than nomenclature.

An additional layer of complexity is given by the mushrooming of “districts” and “regions” established in post-1991 Somalia. Puntland and Somaliland have a defined administrative structure which is different from the pre-war one, with more regions and more districts (9 regions and 49 districts, 6 regions and 42 districts respectively).⁹ Furthermore, a number of lower level districts, whose number varies according to sources, were established based on clan structure and other political considerations, but are not present in the Laws or not approved by the parliament.¹⁰ The other federal member states also followed a similar path, establishing more or less formally new “districts”.

While most of these are, administratively, only nominal, without an administrative structures or even a clear demarcation of the borders, they point at the existence of a complex territorial organization that is not reflected in the usual description given by the international community.

The metrocentricity bias¹¹ is even more accentuated in Somalia where the current security situation and level of territorial accessibility impacts the way ODA, FDI and invisible settlements are far from the major metropolitan areas and not subject to major government intervention.

At best, the narrative over urbanization includes an abstract one-megacity and five secondary city growth-pole model, with some attention to infrastructure corridors (mainly the Mogadishu-Bosaso, Mogadishu-Baidoa, Mogadishu-Kismayo, Berbera-Hargeisa) and corresponding nodal towns located along them. The reality of Somalia, where the only sectors exposed to regional trade are agriculture and livestock, suggests a country where every settlement in every district plays its role in the urbanization process, because all depend on each other’s functions of economic production and social well-being.

How we define the term urban in Somalia has actually become a major challenge in understanding the real urbanization scenario not only in transition areas like

6 D.M. Bohra, Patterns of Urban Settlements in Somalia, *GeoJournal*, Vol. 3, No. 1, Ibero-American Tropics (1979), pp. 63-68

7 Linard et al.: A high resolution spatial population database of Somalia for disease risk mapping. *International Journal of Health Geographics* 2010 9:45

8 The official dataset was updated in 2016. A last update occurred in May 2018 to incorporate P-codes, but features were not modified.

9 For Somaliland, Regions and Districts Self – Administration Law (Law No. 23/2002), for Puntland Laws of the District Councils of the Puntland State of Somalia (Law No. 7/2003)

10 According to the laws, grade are established based on several factors, including population size, geographical coverage and revenue potential of the district.

11 Bunnell, T. and Mariganti, A. “Practicing Urban and Regional Research Beyond Metrocentricity”, *International Journal of Urban and Regional Research* 34(2):415-420, June 2010

rural-urban fringes but especially in the constellation of populated places that scatter the country.

The need is to step beyond the logic of agglomeration and describe in more detail the settlement hierarchies. This recognition of the dispersed reality that characterizes the Somali territorial system and the new conceptualization of urbanization trajectories could also stop the negative feedback loop of governance regimes influencing the population and migration processes, where aid and services are concentrated in large settlements, attracting large masses of economic migrants and displaced populations, therefore concentrating even more aid.

This can also emphasize the agency of smaller settlements and the country system beyond the mechanisms of aid and the overreliance on external help, and indicate new ways of reading the transition from agricultural and the broader developmental process.¹²

2.3 Why Belet Weyne?

The district of Belet Weyne, in Hiraan Region, is part of the recently formed Hirshabelle state.

The city of Belet Weyne is one of the main towns in Somalia. Its strategic position, on the main infrastructure of the country, the Mogadishu-Bosaso corridor, and close to the main agricultural areas of Bay and Lower Shabelle, and to the border with Ethiopia, makes it a central market for livestock and linked products (meat, milk and ghee), and connecting node to the ports of Bosaso and Berbera, both an export route port for agricultural products (cereals and legums) and imported foods that make up a substantial part of the population diet: rice, sugar and vegetable oil, along with other non-food essentials, from soap to clothing.

The territory is also vastly diverse, hosting three of the four broad categories of rural livelihood (Pastoralism, Agropastoralism and Riverine Agriculture) and four of the 18 rural livelihood zones identified in Somalia¹³ :

- Hawd Pastoral,
- Southern Inland Pastoral

- Southern Agropastoral
- Juba-Shabelle Pump Irrigation

When consideration is extended to the Hirshabelle State,

According to the PESS, the district in 2014 had 235,214 inhabitants, roughly 2% of the Somali population, of this:

31,874 urban
32,410 IDPs
170,930 rural

For what pertains the rural population, it is distributed as the following:

• Southern Agro-Pastoral	96,590
• Riverine Pump Irrigation	18,973
• Hawd Pastoral	36,393
• Southern Inland Pastoral	18,973

More recent projections, relative to 2018, talked about a population 306,594, with an urban population of 111,634 and a non-urban population of 194,960.

Beyond the mere figures, the district is representative of the dramatic changes in the lifestyle of Somalis which are also impacting the way they work, live, and settle. For example, pastoralists households whose herds declined due to repeated droughts and other problems turn to agro-pastoralist.

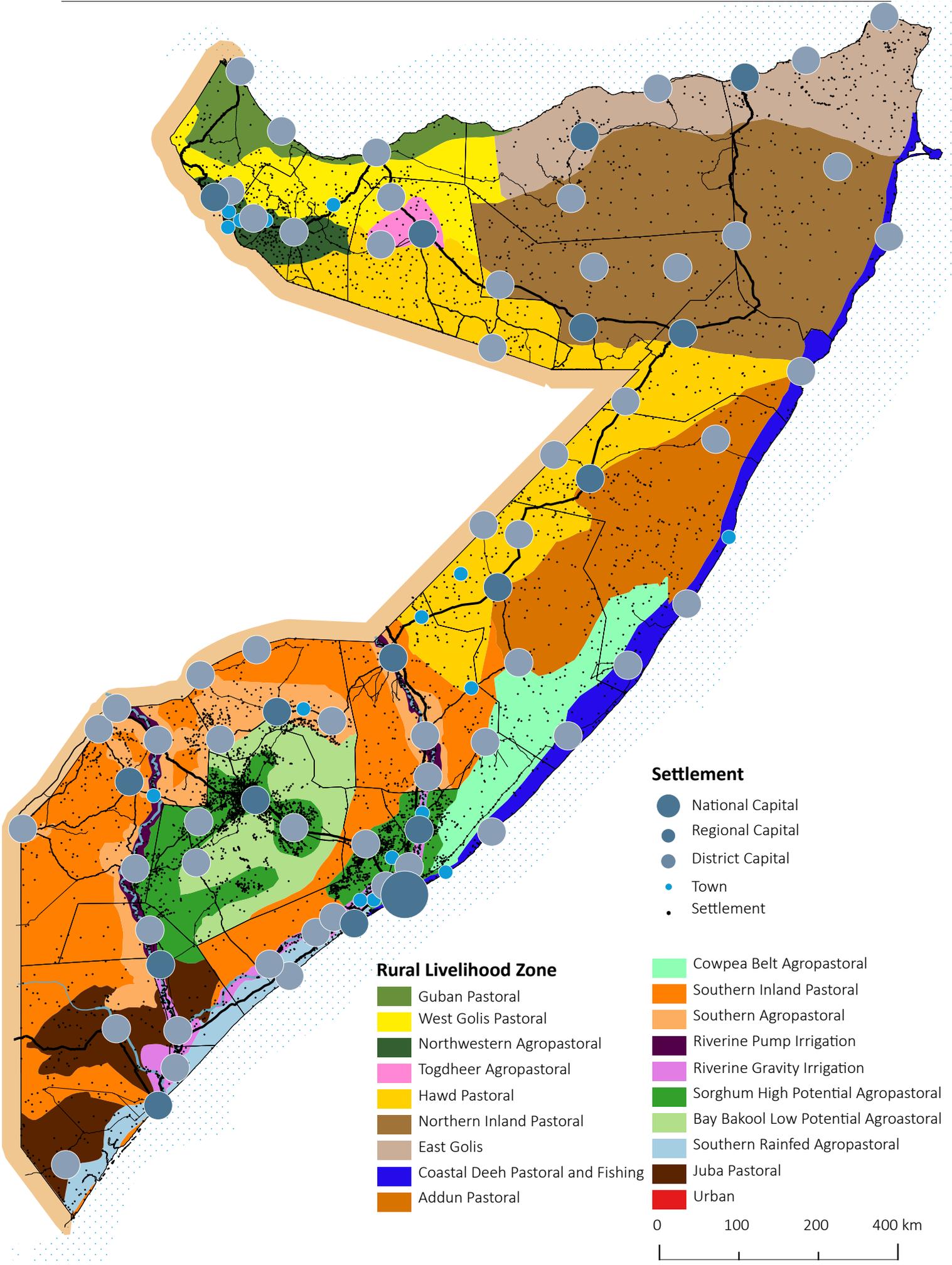
On the other side, there is a growing tendency for wealthier pastoralists to settle into fixed houses, where they may own one or several berkads and possibly a tea-shop or small goods store, and from where they send out their animals with family members or herders contracted from less wealthy households, since livestock are still their main wealth.

Most of these new and old settlement fall into the "rural" group, without consideration their different patterns or the notable differences in terms of densities, functions and morphology.

Far from being an exhaustive sample the Somali territory, the district of Belet Weyne offers a glance at the complexity and at the rich variety of human settlements present in the country.

¹² In terms of urban theory, this links to concepts such as the "planetary urbanism" (Brenner and Schmid - 2015) and Subaltern urbanisation (MukhoPadhyay, Zérah, Denis - 2020)

¹³ FSNAU, Somalia Livelihood Profile, 2016



3. SPATIAL ANALYSIS

3.1 Introduction

The factors which have led to the variation of settlement patterns are many and varied. It is, in fact, important to understand that patterns are a result of a number of forces, working either in conjunction over a long period of time. It is often largely affected by different factors such as topography, climate, fertility of the soil, availability of cultivable land and drinking water at one hand, and political and economic factors, like development of road links and economic corridor, on the other hand.

The study aims at analysing patterns from a morphological point of view, classifying human settlements in different categories related to the configuration they acquired. The categorization is mainly built on three basic variables: the human settlement's dimension, its spatial arrangement and its degree of density, respectively defined as "size", "spatial arrangement" and "compactness".

The study is divided in two sections: the first part concerns the analysis of settlements pattern in the Hirshabelle State, which gives a general idea about distribution and types in the territory, while the second one focuses on the Belet Weyne district, deepening the survey in a more circumscribed area.

3.2 Hirshabelle State

The sampling frame for the rural areas have been based on the cross comparison between the updated SIMAC master list of settlements and the polygon features of Open Street Map identified with the tag *landuse = residential*.¹

In this way it has been possible to have a more updated information about the human inhabitat places. This has not been verified except with satellite images, available in high resolution mainly for the whole area analyzed, but taken for different years (Google Maps 2017 - 2020).

From this comparison it has emerged that some data contained in the updated master list of the settlements have not a corresponding polygon resulting from the Open Street Map information. These points, compared with satellite images, refer most of the time/always to very small settlements composed for the most part by single isolated structures - most of the time appearing to be buuls or tents - without any claim of aggregation. See here some examples at Fig.1.

Although potentially definable as "settlements", since any form of human dwelling where groups of people reside and pursue their life goals can be understood as such, these points have not been considered useful for the purposes of the study and for this reason they have been classified as "non-significant settlements". However, to ensure an overview of the distribution of points for possible future monitoring, they have been recorded on the map under a specific layer.

3.2.1 Morphological considerations and classification of settlements

Among different characteristics that could define a human settlement, this study mainly analyses those

areas and using a tag from *Key:landuse*. Features with a landuse tag are described as "used for by humans". In areas with low level of detail, such as Somalia, the tag *landuse=residential* generally concides with human settlements

1 OpenStreetMap supports mapping land use by drawing in simple



which refer to physical characteristics that make up built areas. These are: size, spatial arrangement and compactness.

“Size” refers to the settlement area, or rather the surface circumscribed by the Open Street Map polygon; “spatial arrangement” refers to the configuration and layout of the settlement, or rather its geometrical pattern; “compactness” refers to density, or rather building to land ratio.

According to these characteristics, it has been possible to establish a taxonometry of human settlements and distinguish them between different types.

More specifically, for each characteristic, some sub/macro-categories have been defined to exhaustively describe all the physical features of the settlement to which they refer.

It is interesting to note that, while compactness is usually been considered a significant parameter to define the urban character, the denser and larger settlements are the ones seemingly more rural in function - with an organic spatial arrangement and land division typologies which show no evidence of non-agricultural uses.

Many smaller and more dispersed settlements, especially in pastoral livelihood zones, show instead clear signs of commercial activities - all “linear” types shown ahead have non-residential building typologies clustered around a “high street” or a square - giving them a more urban-like quality.

Size

Human settlements have been preliminarily organized into three sets according to their size. In this way it has been possible to easily compare the settlements with similar characteristics, deepening the level of

investigation and avoiding different-scale comparison which would have needed a more complex level of analysis.

This hierarchical arrangement is evidently a theoretical one, without any pretense of extracting specific features from each set (for example the level of urbanization), instead, it aims at systematizing as much as possible the adopted interpretation. Moreover the tripartite classification has been useful to set up the methodology for the second phase (see paragraph 3.2.1). The three sets are so composed:

- Large settlements: > 100ha;
- Medium settlements: from 25 to 100 ha;
- Small settlements: from 10 to 25 ha.

This loose categorization already reveals a certain variety, and allows for a deeper understanding of the territory.

The following maps compare the representation from the SIMAC settlement master list, distinguishing between regional and district headquarters, towns and settlements (on the left) and the settlement per size category from the OSM database (on the right).

While size not necessarily correspond to importance, the different layer in the maps seem more corresponding to each other: for example, roads connect nodal settlements and not empty stretches of territory. It must be noted that the road layer in the maps only shows the main road infrastructure - up to tertiary roads. OSM actually has a really high number of tracks and paths mapped, but since the study area was mapped in an unbalanced way - see “limitations” for reference - they were left out. This may explain why some even large settlement appears not connected to any road.

- Somalia boundary
- Hirshabelle State boundary
- District boundary
- Indian Ocean
- Shabelle River

Road Infrastructure

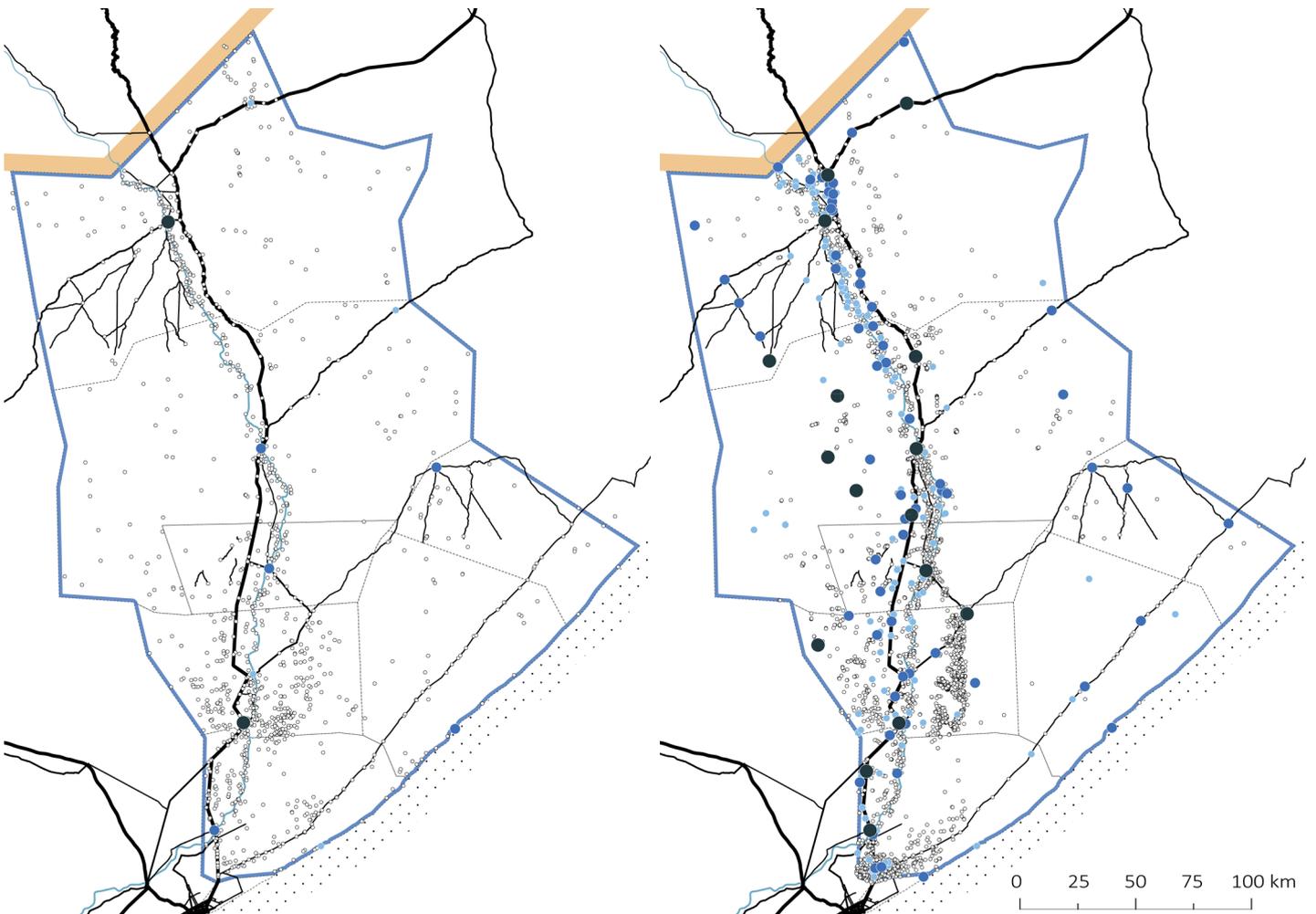
- Primary
- Secondary
- Tertiary

Official Somalia Settlement layer (OCHA)

- Regional Capital
- District Capital
- Town
- Settlement

Mapped Residential features (OSM)

- < 100 ha
- 25 - 100 ha
- 10- 25 ha
- 0- 10 ha



Large settlements

Settlement area > 1.000.000 m²



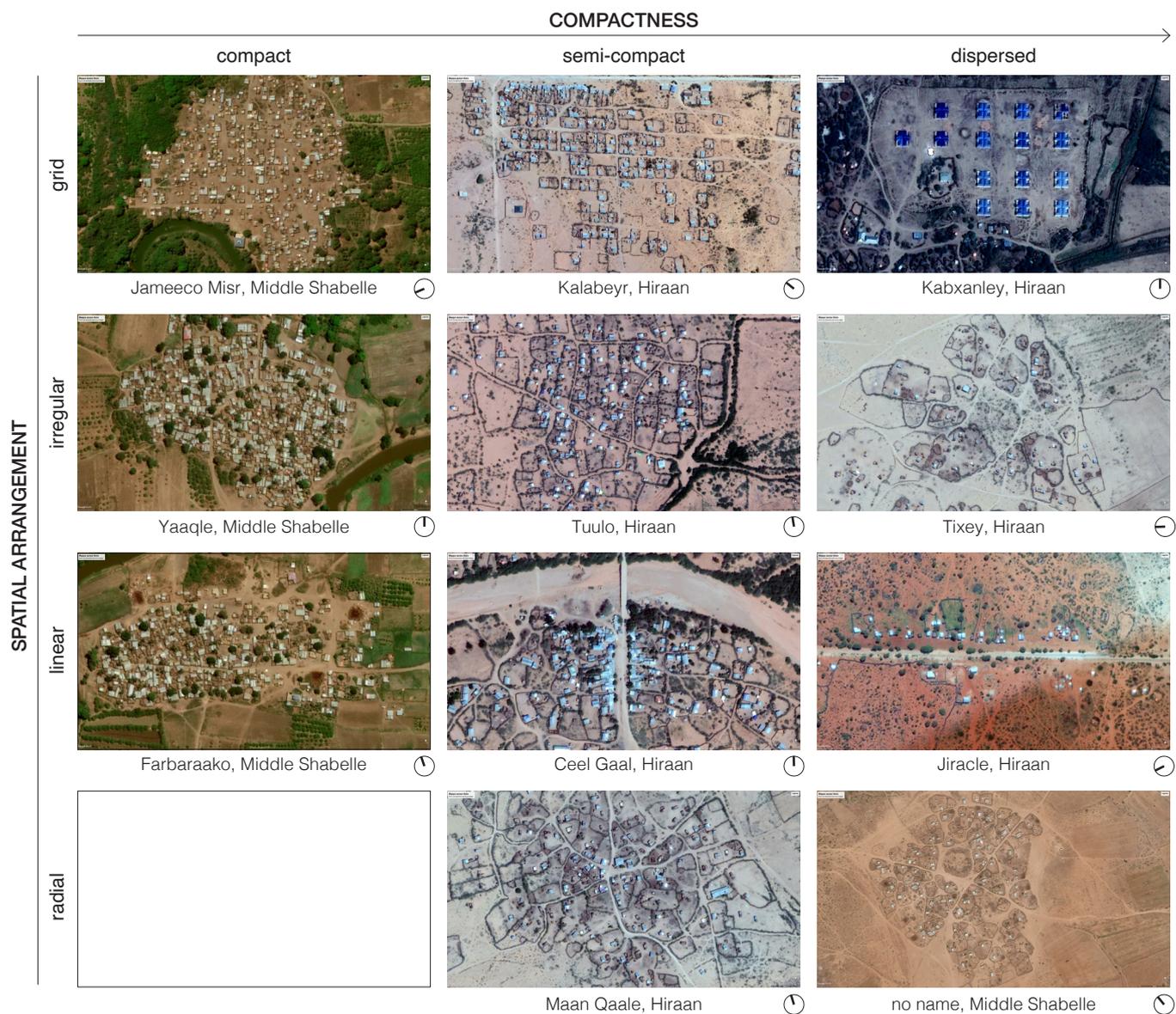
Medium settlements

Settlement area: from 250 to 1.000.000 m²



Small settlements

Settlement area < 250 mq



Spatial arrangement

The human settlements have been also classified in four types of patterns according to the spatial configuration and layout they acquired, or rather the distribution of buildings within the settlement. Although many of them, especially the small ones, have a very simple structure and a scarce “built matter”, it could be said that each of them follows a specific logic of aggregation, depending on multiple factors.

It is interesting to notice how settlement spatial arrangements align with the different rural livelihood zones, therefore pointing at some characterisation in use.

Although there are many types of pattern, a simplification has been necessary at the expenses of those rare settlements whose configurations (t-shaped, cross-shaped) were almost unique within the general scheme. In this case, they have been adapted to the most similar layout shared by the rest of settlements.

The most common types of patterns in Hirshabelle State are here summarized:

- Grid: based on a rectangular net that divides the terrain into small blocks, where streets

lie perpendicular to each other; It is most common in larger centers which, given their relevance and higher land values, where subject to some sort of planning;

- Linear: mostly associated with linear features, either natural (water resources/ streams) or more frequently human built (roads), that predates the settlement arrangement and along which buildings are located. This spatial arrangement appears to correspond to pastoral and agro-pastoral areas, where inhabitants associate livestock with commercial activities as a coping mechanism.
- Radial: in this pattern, buildings and streets spread out from a nodal point, which may be a source of water (pond, well), a mosque, a centre of commercial activity or simply an open space;
- Irregular: the settlement is spread organically across the landscape or may cluster around certain land resources, but without following any specific geometrical pattern or apparent hierarchy.

Road Infrastructure

- Somalia boundary
- Hirshabelle State boundary
- District boundary
- Indian Ocean
- Shabelle River

Road Infrastructure

- Primary
- Secondary
- Tertiary

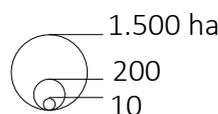
Compactness

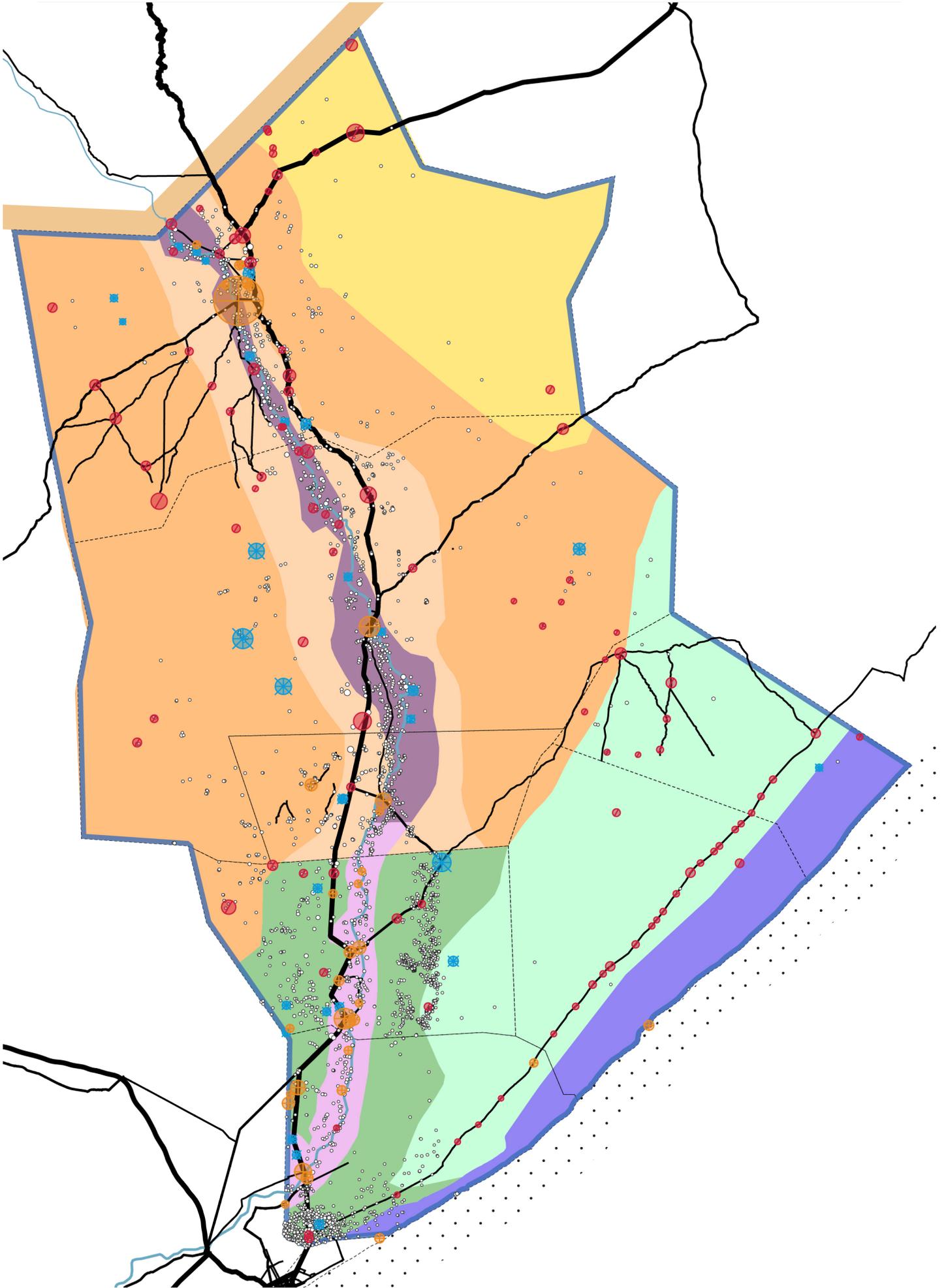
- Grid
- Linear
- Radial
- Irregular

Rural Livelihood Zone

- Hawd Pastoral
- Coastal Deeh Pastoral and Fishing
- Cowpea Belt Agropastoral
- Southern Inland Pastoral
- Southern Agropastoral
- Riverine Pump Irrigation
- Riverine Gravity Irrigation
- Sorghum High Potential Agropastoral

Settlement Area





Compactness

Human settlements have been further organized by their degree of compactness in order to analyse the morphological density of the built environment. The compactness is therefore the ratio between built and open areas. Three sub-categories have been identified:

- Compact: these settlements are those in which buildings are constructed very close to each other;
- Semi-compact: it represents an intermediate type between compact and dispersed settlements where buildings are not well-knitted but still geometrically definable;
- Dispersed: houses are separated far apart and often scattered with fields or large courtyards.

Where the degree of aggregation was too low settlements were not taken into consideration.

Again, it appears that compactness have some level of connection with rural livelihood zones.

While most settlements are concentrated in agricultural and agropastoral areas along the river, the southern part of the Shabelle - corresponding to the “Riverine Gravity Irrigation Zone” - presents the most compact settlements.

The “Riverine Pump Irrigation” has settlements with more dispersed configurations, and consequent lower densities.

The “Sorghum High Potential Agropastoral Zone” have still a very high number of points, but they result to be mostly scattered structures with no evident logic of aggregation.

In Pastoral areas, settlements are more rare constituted mostly to isolated structure.

Road Infrastructure

- Somalia boundary
- Hirshabelle State boundary
- District boundary
- Indian Ocean
- Shabelle River

Road Infrastructure

- Primary
- Secondary
- Tertiary

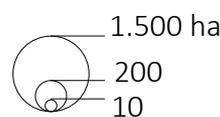
Compactness

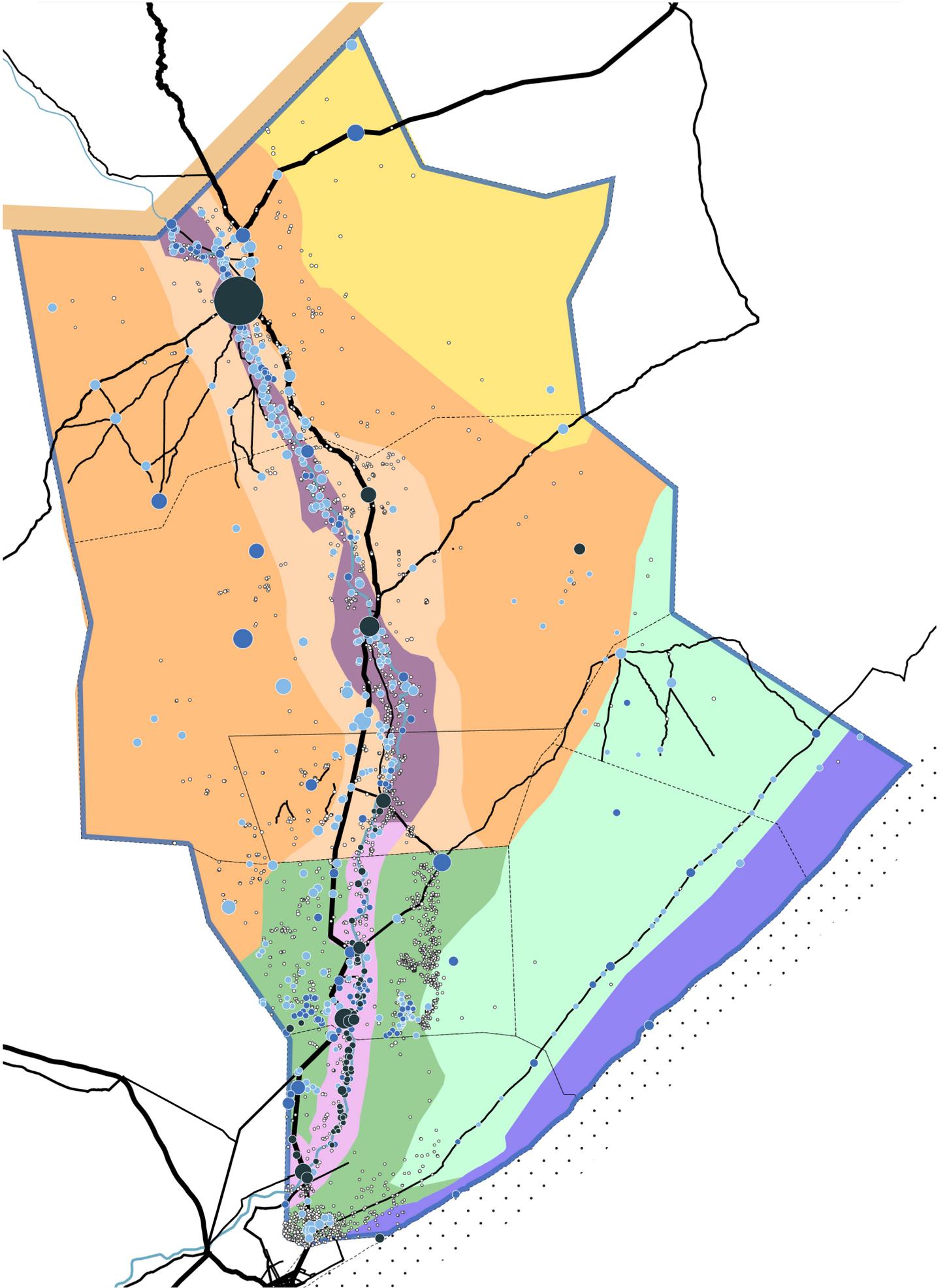
- Compact
- Semi-compact
- Dispersed
- Non-significant

Rural Livelihood Zone

- Hawd Pastoral
- Coastal Deeh Pastoral and Fishing
- Cowpea Belt Agropastoral
- Southern Inland Pastoral
- Southern Agropastoral
- Riverine Pump Irrigation
- Riverine Gravity Irrigation
- Sorghum High Potential Agropastoral

Settlement Area





3.2 Belet Weyne District

This second part focuses on a more accurate analysis of settlement patterns in the Belet Weyne district with the aim of capturing the many dimensions of “urbanness” and eventually calling into question the parameters on which the official definition of “urban” is currently based.

Since the current definition uses minimum population threshold (2,000 inhabitants) as a mean of identifying settlements as “urban”, together with an administrative criteria, it does not take into account other factors (such as population density, economic function, significant majority of the population not primarily engaged in agriculture, presence of sewerage/drinking water/electric lighting etc.) that could be useful for a periodic reclassification.

This study phase aims at measuring and analysing spatial patterns that eventually help characterize urban features. It is composed by two phases:

- a two-layered analysis;
- a population estimate.

3.2.1 Two-layered analysis

This phase is composed by a two-layered investigation questioning the urban/rural character of settlements:

- a functional analysis, regarding the location of a settlement in relation to the surrounding service area;
- a historical analysis, referring to, if present, the cultural-related significance of settlements.

Position

Three locational characteristics seem to condition the settlements structure and their distribution within the territory, as well as determine the importance in terms of size and population:

- the presence of transport infrastructure;
- the presence of the river;
- the presence of waterpoints.

In Belet Weyne district, the infrastructure system is mainly related to the presence of a primary road axis which connects Mogadishu with the Northern cities of Somalia and the port of Bosaso. This axis flows parallel to one of the Shabelle, one of the two only

permanent river of the country, along which all the major cities of the Hirshabelle State (Belet Weyne, Bulo Burto, Jalalaqsi and Jowhar, Balcad) are located.

The existence of the river, as the most important water resource for agriculture and pastoralism, and the presence of the primary road, as the main connection, constitute the premise of an infrastructural corridor.

It is then possible to observe how most of the built areas of the district often organize themselves along the river, creating a sort of “riverine” rural agglomerations and taking advantage of the mild climate, the fertility of the soil and the flat topography.

The main towns - by surface and, as the next chapter will show, population - are where two of these features intersect:

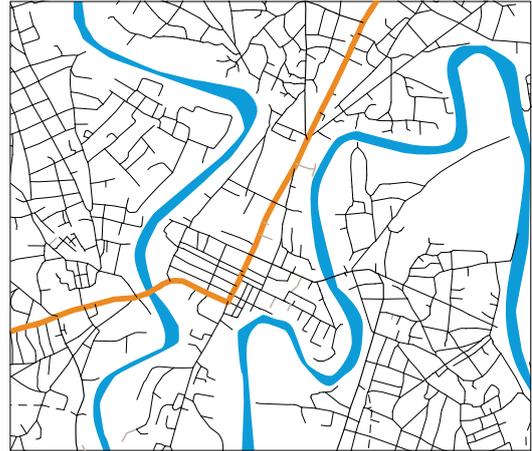
- Belet Weyne, standing on the Shabelle banks, is the main nodal town of the region, on the Mogadishu-Bosaso Corridor, and on the secondary road connecting Hiraan with the western agricultural regions of Bakool and Bay;
- Matabaan, surrounding a spring, also on the Mogadishu-Bosaso Corridor, half way between Belet Weyne and Dhusamareb;
- Ceel Cali, siding a large area where an underground aquifer surfaces, is at the center of a web of tertiary roads and track;
- Jawiil, along a seasonal wadi, is at the junction between the Mogadishu-Bosaso Corridor and the road connecting the border town of Ferfer and Ethiopia.

The converging features make these settlement more difficult to interpret in terms of spatial arrangement, having characteristic defined in other part of this documents as “grid”, “linear” and “radial” at the same time.

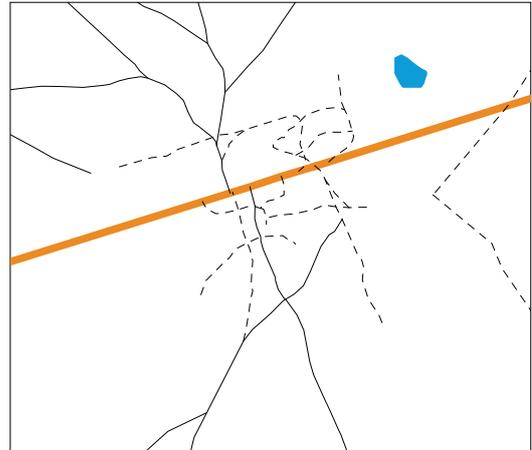
Another important feature is the presence of the airport which makes Belet Weyne the most important hub for the entire district.

The city does not seem to have a large number of satellite settlements but, at the same time, it seems to condition the urban character of several small hamlets located along the river at a radius distance of around ten kilometers (see, for instance, the three small settlements of Gambarlawe, Quracle and Lebow presented previously).

Beledweyne



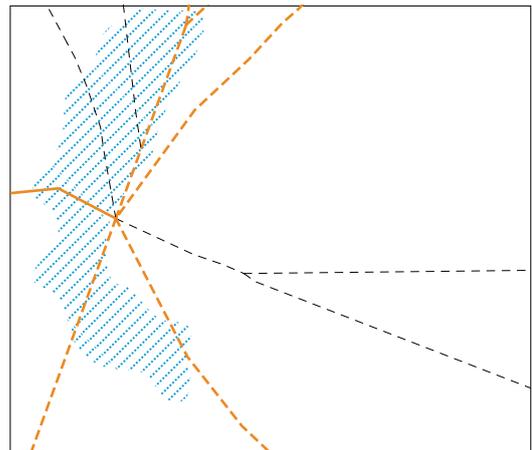
Matabaan



Jawiil



Ceel Cali



— Main Road ■ Shabelle River — Seasonal River ■ Water Spring ▨ Aquifer



Fig. 1. Water access and infrastructure as main topographic features determining small settlements



Fig. 2. Rural settlements with water access but no apparent non-residential use



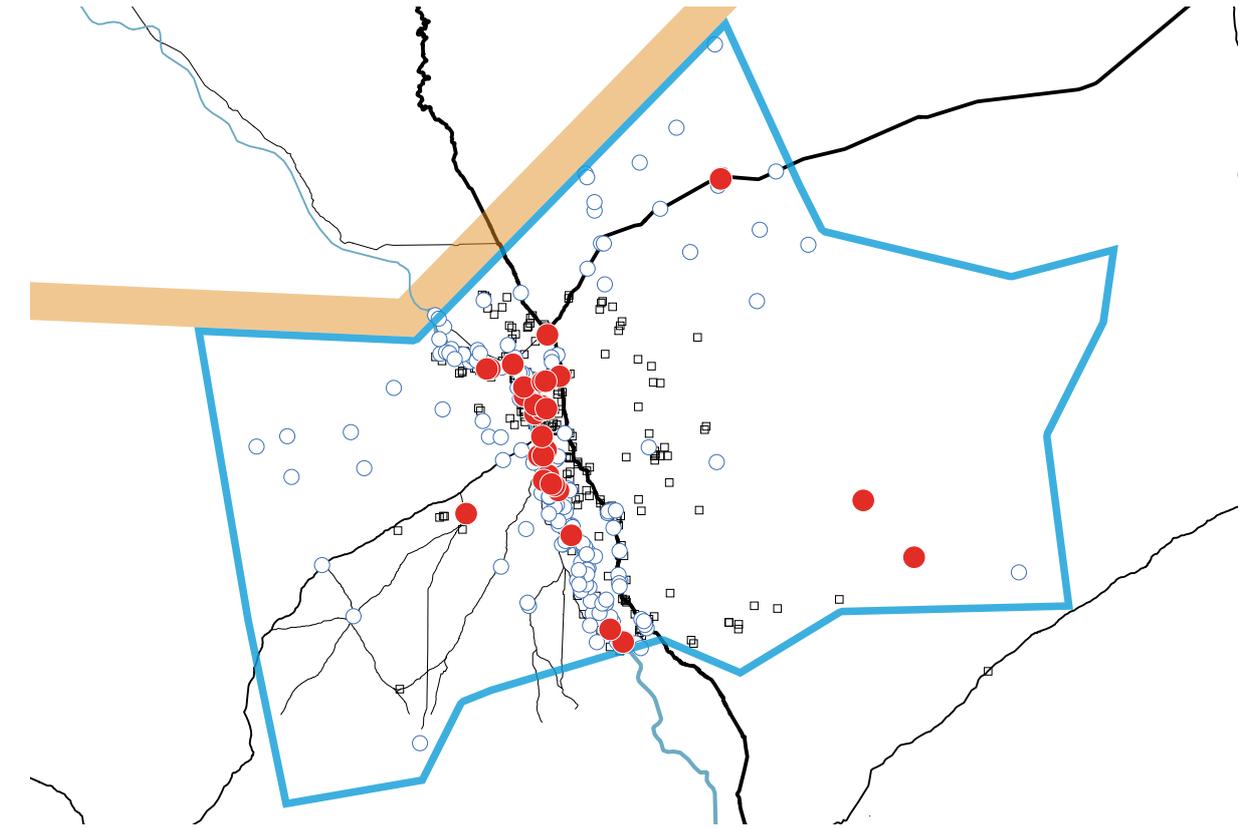
Fig. 3. Settlements with some central function - mosques, markets

Also at a smaller scale, it seems these two factors - presence of water and transport infrastructure - are key elements determining the location of a settlement.

Water is of course a predeterminant, but it is not "enough" for the settlement to develop a structure tending to "urban". This is said in terms of functions and morphology, and not densities. As said before, most of the settlements along the Shabelle show an organic spatial arrangement and land division typologies which show no evidence of non-agricultural uses, even with an "urban-like" density.

Commercial activities - clustered around roads, river fords or water points as natural crossing points for nomads and travellers or a square - can be seen in several other settlements. Other centralities which can give a settlement a more "urban-like" quality in terms of function and morphology are mosque, schools, health post and markets.¹

¹ Their presence was mapped through OSM.



- Somalia boundary
- Beledweyne District boundary
- Shabelle River
- Primary
- Secondary
- Tertiary
- Urban-like density
- Other settlement
- Non-significant settlement



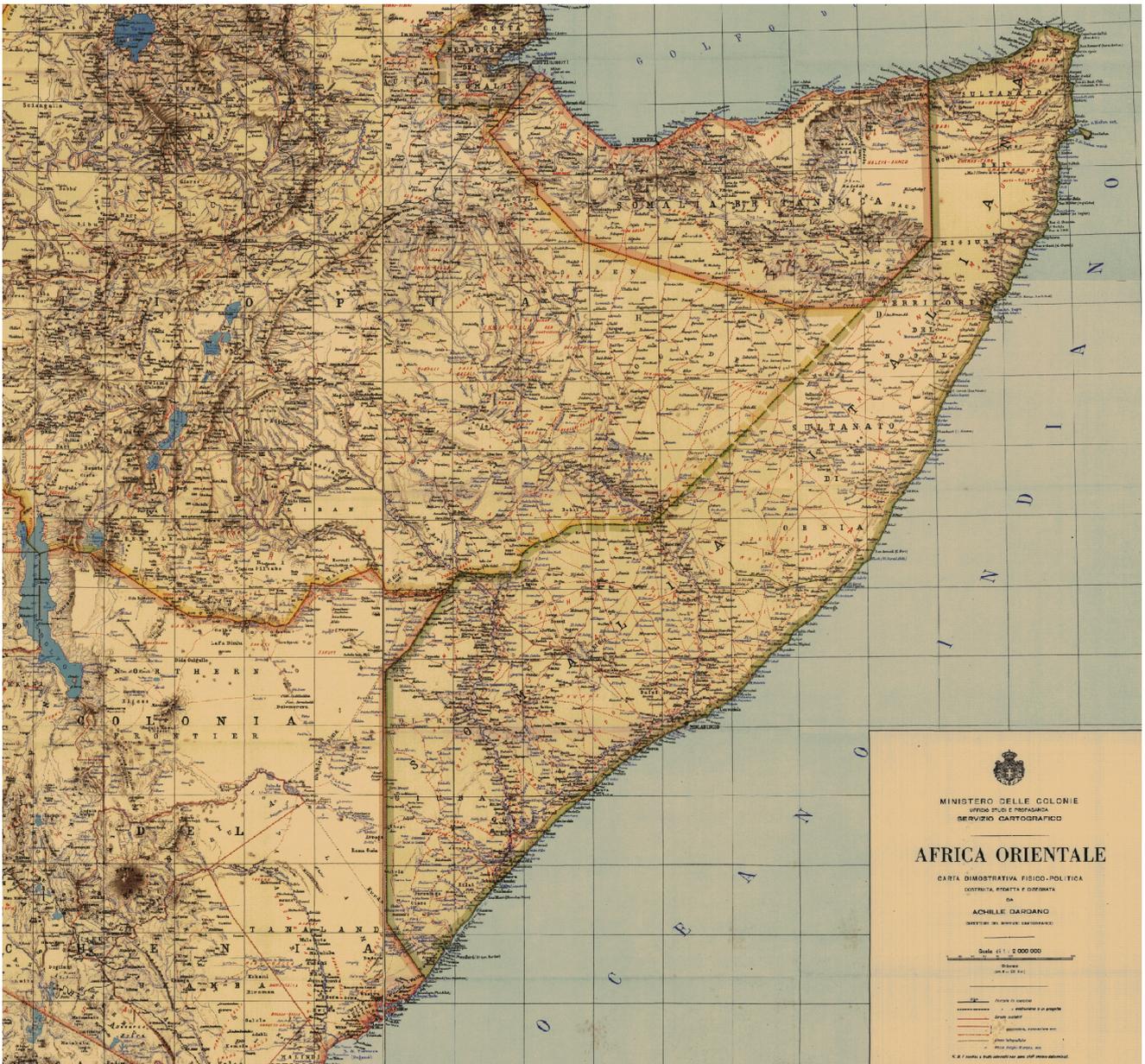
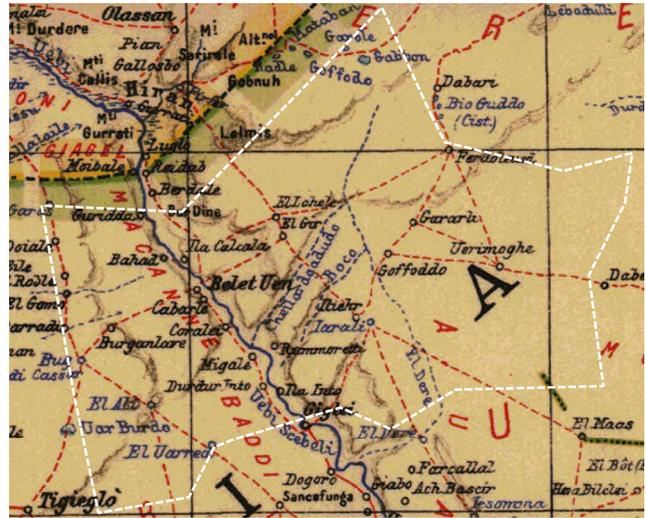
0 25 50 km

- Urban like functions and morphology
- Other settlement
- Non-significant settlement

Historical significance

The cultural/historical significance analysis starts from the accurate comparison between the selected human settlements and the historical map drawn by the Italian Ministry of Colonies in 1925, which constitutes one of the first “scientific” map available of the region. The physical-political map, curated by Achille Dardano, in that year director of the ministry’s cartographic service, represents part of the Eastern Africa at the beginning of the century.

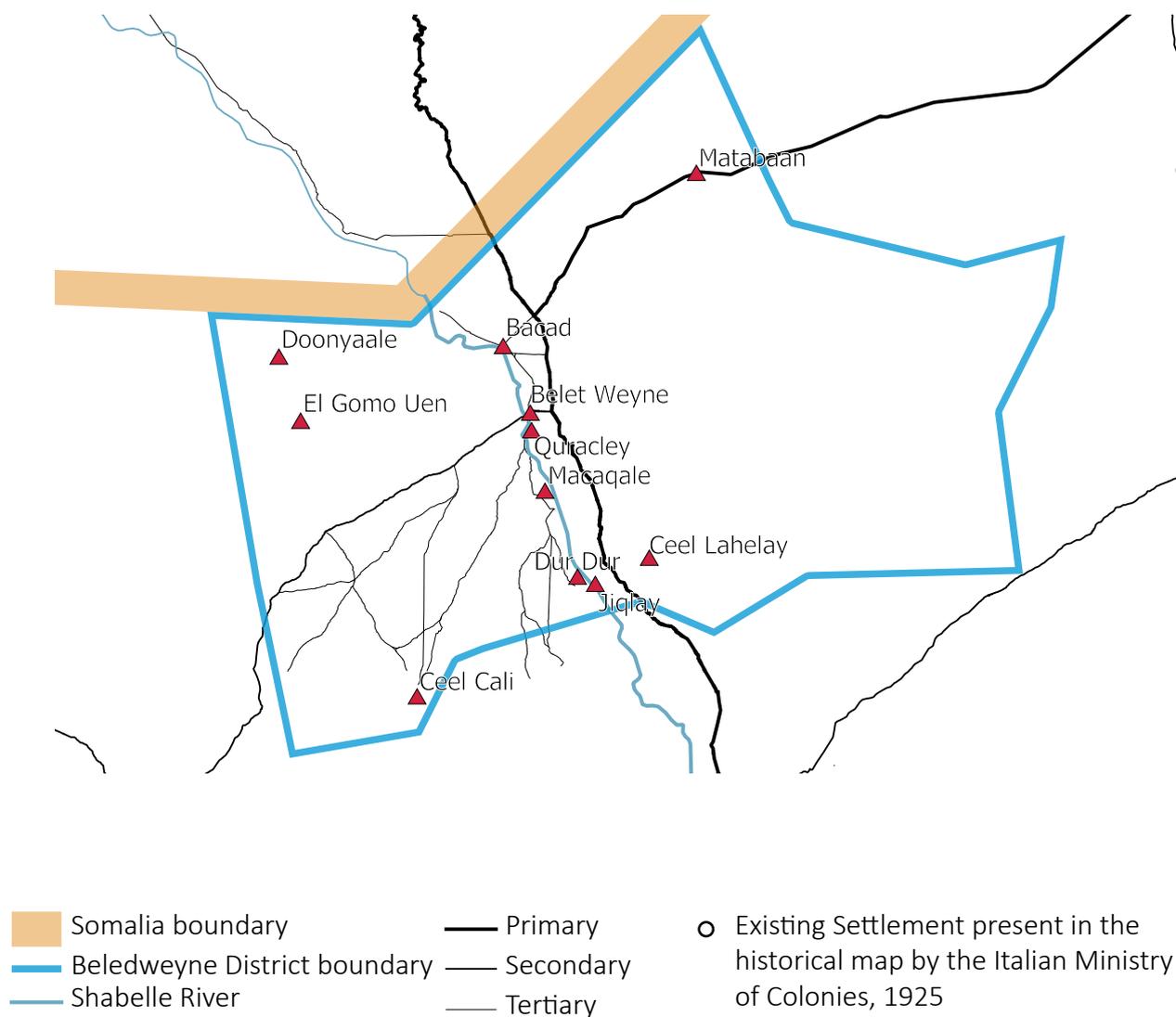
“Duration of settlement” is not a variable usually introduced for defining an urban center and its relevance.



The fact that a settlement was already existing at least one hundred years ago is definitely of some significance.

Settlement present in the map predate the construction of the Mogadishu-Bosaso road, and therefore signal the presence of historic nodes along nomadic routes, commercial center and other type of settlements existing before colonial times.

Furthermore, while most new settlements start and grow because of the presence of transport infrastructure, the settlements on the map determined the location of most of the now existing roads in Belet Weyne District.



0 25 50 km



3.2.2 Density estimate

In order to refine the analysis, a calculation of the settlement's density was performed. This step has been useful to make a theoretical estimation of the population of each settlement and to assess when a certain settlement, reaching the 2,000 inhabitants, could be considered "urban", according to the official definition.

This phase has been structured in two different moments:

- a digitized dwelling structure count;
- a density and population estimate.

Digitized dwelling structure count

Due to the inability of carrying on a ground computation, the dwelling structure count has been established through a digitized manual calculation of the number of dwellings present in each selected settlement. The selected settlements refer to those ones emerged from the three-layered analysis and reported in the relative tab.

Thanks to the high-resolution satellite imagery, rooftops have been identified and counted, taking into account the different types of construction and building materials. Aware of the approximation, each dwelling structure has been theoretically considered a single household.

Population and density estimate

On the base of the dwelling structure count, some crude estimation can be carried out. Taking into account an average household size of 5¹, and multiplying this for the number of digitized dwelling structure, an indicative estimate of the population respectively for each settlement could be obtained.

Considering the errors inherent in the dwelling structure count (partial coverage, the fact that this

1 Average urban household size in Hiiraan region as per PESS. The urban household size was chosen instead of the rural or nomadic (6.1 and 6.2 respectively) to have an approximation by defect.



calculation doesn't take into account multi-family buildings and IDP settlements but may count in non-dwelling buildings), the figures can be considered a lower threshold.

From the population values it has been easily possible to calculate the estimate of the density. Starting from this, it has been easily possible to calculate by interpolation an estimate of the population for every settlement having a computable area.

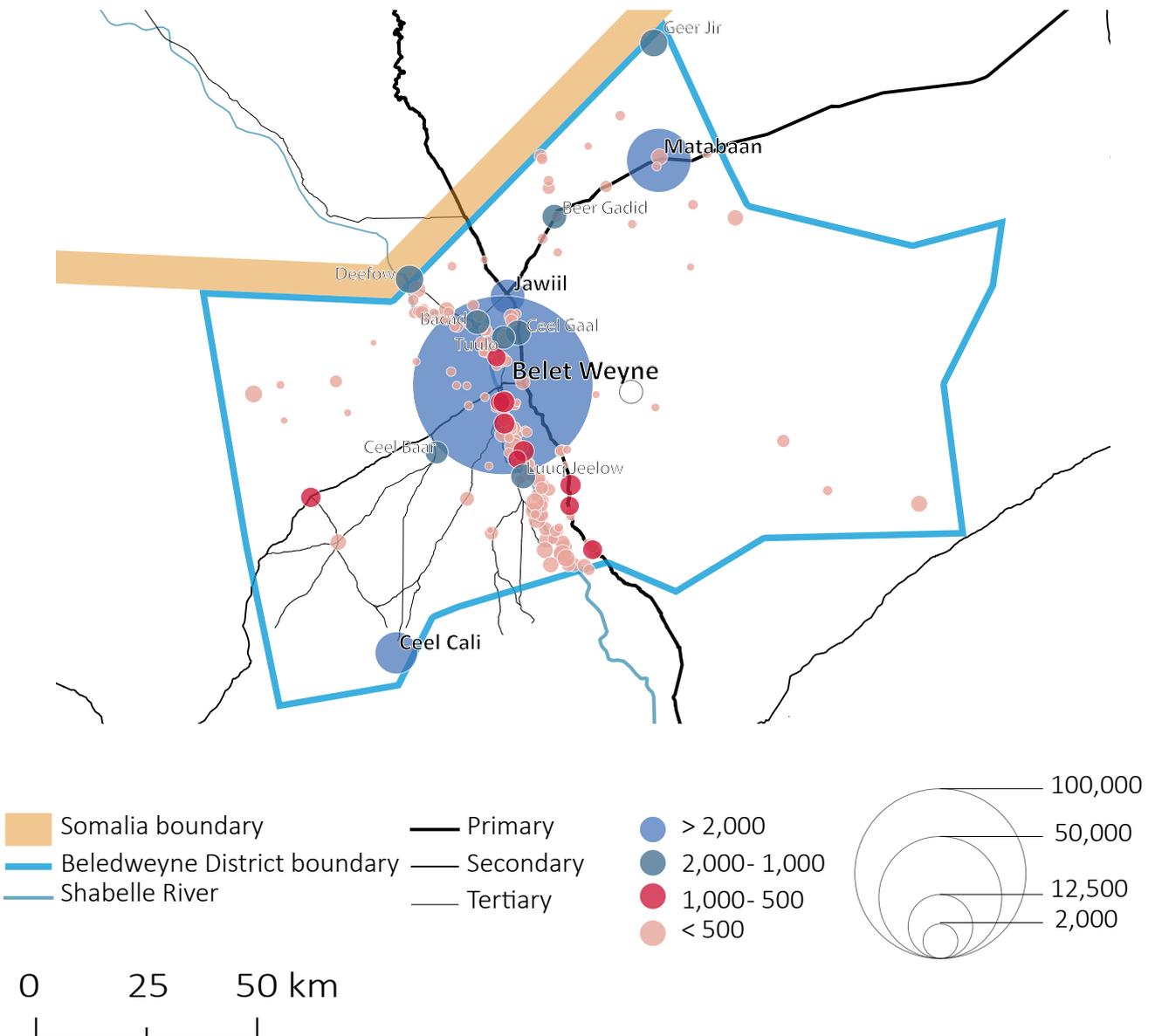
The map below shows the result of this calculation. It appears that 4 settlement (Belet Weyne, Matabaan, Ceel Cali, Jawiil, in light blue) are beyond the 2,000 threshold for the official definition of urban settlement.²

This is already three more than the one included in the census (only Belet Weyne) and two more than the one present in the UN settlement layer (which includes also Matabaan).

Other 8 settlements (in dark blue) have an estimated population lower but very close to the threshold.

Other 9 Settlements (in dark red) have still a considerable population (>500).

² As in the definition of the Somalia State Planning Commission in 1975.



4. CONCLUSIONS AND WAY FORWARD

4.1 Conclusions

The different maps illustrate different ways of describing the territory based on a variety of factors. They do not propose a method to defining urban settlements, but are nothing but an attempt to represent through symbols the complex geographical reality of Somalia, which cannot be resolved through the urban/rural (or rather, non-urban) dichotomy.

Starting from this realization, it appears quite clearly that a review of the way policy describes human settlements and territorial settings is needed. Even though definitions are failing to match reality, rural and urban are still relevant concepts and boundaries between them are yet to be erased. The Federal Government of Somalia through the Ministry of Public Works, Reconstruction and Housing has started a process to define a roadmap for the elaboration of a National Land Policy and a National Urban Policy, which necessarily will have to look into this issue and eventually shed light on the matter.

However, the question which arises is how to encourage specific territorial responses, allowing cross-sectoral interventions to move beyond traditional policy divisions. The need is to identify a network of settlements with their territorial influence (i.e. the geographical reach of different settlements' functions in the surrounding territory) and the existing socio-economic linkages between them, to better understand the interconnections between these livelihood and services demand, on one side, and governance, planning and management of services on the other, and the implications for improving people's access to services and accommodating population growth.

Determining the functional hierarchy of settlements based on availability and diversity of their services,

infrastructure and socio-economic activities can allow interventions which are more rooted on the socio-cultural and economic environment of Somalia and therefore more effective and impacting.

4.2 Limitations

It is important to mention that this study does not have any intention and claim of making a population estimation of the current rural settlements, but rather attempts at shedding some light on the complex organization of Somali territory and human settlement pattern beyond the macro-category of urban and rural.

Moreover some limitations must be observed. First of all, the study was developed in 2020, when pandemic-related restrictions in internal and international travel and limitations in physical meetings forced to opt to a purely remote based approach.

Various methods of interpretation of satellite imagery were therefore used. It must be observed that the use of Google Earth as the main source gave access to images of sufficient quality of the whole study area, but they did not belong to the same period, or rather they portrayed various time periods both in terms of year that in terms of season. Given the nomadic or seasonal nature of part of the population, and the vast unpredictability of climate conditions in the past decade, this may have affected the observations.

At the same time, high-quality satellite images with different spectral bands could have allowed for automatic classifications of the settlements, complementing and enhancing human expertise in interpreting satellite imagery. The lower quality of the images available would have implied an expanded time for training of automatic classification modules

which were not matching time-framework of the study, which therefore relied only on visual recognition and semi-automatic classification.

Additionally, most of the study is based on Open Street Map information, which has some evident limitations. Firstly, it would be appropriate to adjust the perimeter of polygons which, in many cases, do not correspond perfectly to the extension of the settlement shown in the satellite images (also because it could undergo variations over time); secondly this congruity should be verified with recent satellite images belonging to the same period; thirdly, in order to have a better compliance, things should be verified on the ground.

4.3 Way Forward

Looking at the future, use of automated methods could allow to not only make the process faster and less susceptible of mistakes, but also easily incorporate new data as it becomes available.

This could mean for example taking into considerations various images of the same location, thus overcoming the “static” nature of the observation, introducing factors such as seasonality and impact of climate events (droughts, floods, etc) into the evolution of the settlements.

Further on-field research would be needed to get a more indepth and realistic understanding of the specific attributes of each settlement, in order to compare their functions, organize them in hierarchical categories and analyse the spatial relationships between them.

Even with scarcity of data, uncertainty, rapidly evolving urban processes, weak planning systems and low accessibility, methodologies such as UN-

Habitat’s Spatial Development Framework could be deployed.¹

Furthermore, because a key asset for pastoralists is their knowledge of the local environment, an approach is needed to ensure that this collective wisdom is not only included, but also influence their capacity for planning and managing human settlements.

1 Spaliviero, M. et alii (2019) The Spatial Development Framework to facilitate urban management in countries with weak planning systems, *International Planning Studies*, 24:3-4, 235-254

