A unified national small-area division strengthens the foundation of area-based data

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Authors: Ville Helminen[1], Rina Tammisto[2] & Panu Muhli[3]

1) Finnish Environment Institute
2) Statistics Finland
3) National Land Survey of Finland

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High-quality decision-making and effective use of public funds require area-based data that reveals real spatial differences, local needs, and the impacts of decisions, and supports the provision of equal services across the country. High-quality and cost-efficiently maintained area-based data is based on interoperability between national geospatial data and statistics. To ensure this, we propose the introduction of a nationally unified small-area division.

Area-based data refers to information structured by geographic areas, such as municipalities, sub-municipal areas, or regions. Spatial divisions enable the combination of data for different purposes. Such information is needed across all administrative sectors, as a single figure for the entire country rarely provides a sufficient overall picture. Examples include transport investments, prevention of regional segregation, targeting regional subsidies in rural areas, location of social and healthcare services, or the impacts of land-use planning.

Although Finland has a high-quality information infrastructure by international standards, the study *Geospatial Data in Finland's Statistical Production* indicates that interoperability is limited by the absence of a unified small-area division. The need arises because municipalities' own subdivisions, postal code areas, or grid data do not form a nationally compatible and stable basis for statistics and area-based analysis.

Sub-municipal statistical and functional geospatial divisions and administrative divisions

In Finland, the most common geospatial divisions are municipality-based administrative divisions. However, municipal boundaries are often too coarse for many data needs, as they do not meaningfully or consistently reflect the current settlement structure. Phenomena influencing regional development—such as population ageing or segregation—manifest at smaller geographical scales. Transport systems do not follow municipal boundaries.

Area-based data is needed both for intra-municipal phenomena and processes that cross municipal borders. Currently, analyses often rely on statistical grids. Grid-based data is excellent in being independent of administrative boundaries, but its use is increasingly restricted by stricter data protection requirements. Data must be suppressed in cells with few observations. Grid-based data also forms a separate system that is not interoperable with administrative datasets.

Responsibility for developing and maintaining geospatial divisions is currently fragmented across several organisations, especially at sub-municipal levels, resulting in a fragmented national overview.

Finnish legislation and administrative practice recognise and require the use of sub-municipal areas in various sectors, but geospatial divisions remain fragmented, and no unified national small-area system exists in legislation. Such divisions are needed when legislation refers to areas with specific characteristics (e.g. densely populated areas).

Current state of national geospatial divisions

The current system includes multiple overlapping geospatial classifications, such as:

- Administrative divisions (municipalities, regions, wellbeing services counties)
- Statistical divisions (municipal-based, NUTS classifications)
- Postal code areas
- Statistical grids (250 m, 1 km, 5 km)
- Voting districts
- Municipal statistical sub-areas
- Neighbourhoods and districts in cities

These vary in coverage, stability, compatibility, and maintenance responsibilities, and do not form a coherent national system.

Towards a unified national system of geospatial divisions

The vision is a hierarchical system where small areas form the foundation for producing various statistical regions beneath administrative divisions.

The goal is to replace the current fragmented system with a unified national small-area model that meets the needs of different administrative sectors. This would ensure continuity of area-based data even in cases of municipal mergers or other administrative changes.

A unified national small-area system would:

- Cover the entire country
- Be administratively compatible
- Be technically harmonised
- Provide a stable foundation for all future area-based statistics and analytics

In the long term, such unified geospatial divisions should be widely used across sectors and developed strategically, integrated into statistical, evaluation, and forecasting processes, and used for targeting policy measures and monitoring impacts.

Small-area division model

The small-area model is a data management approach designed to support the production of small-area units as part of an interoperable national system of geospatial divisions in Finland. Rather than defining a single fixed geospatial division, the model establishes principles and structures for creating small areas that can be adapted to different statistical and analytical purposes.

In its initial implementation, the formation of small areas is based on population size, ensuring that areas are sufficiently comparable and statistically meaningful. Over time, however, the criteria for delineating small areas can be adjusted to reflect evolving data needs and policy priorities. This flexibility allows the model to support a wide range of uses while maintaining a coherent underlying structure.

Benefits and use cases

The proposed model addresses key shortcomings of the current system by harmonising small-area information and preventing the fragmentation of area-based data, particularly in a context where administrative structures are increasingly organised around larger territorial units. By establishing a common framework, the model improves the efficiency of data production and reduces the need for user-specific adjustments and custom spatial aggregations.

From a data protection perspective, small-area units provide a more robust alternative to grid-based data, as they allow for the publication of detailed geospatial information while reducing the need for data suppression due to small cell sizes. This enhances both usability and reliability of statistical outputs.

The potential applications of the model are wide-ranging. It supports urban and regional planning, the monitoring of regional land use, housing, and transport, and the planning of service networks within wellbeing services counties. It also enables more precise monitoring of spatial segregation, supports transport modelling and academic research, and provides a foundation for the preparation of new

legislation. In addition, the model can be used in various types of risk and security assessments that depend on geospatially detailed information.

A significant cost advantage stems from the establishment of a shared base dataset. By providing a unified framework, the model eliminates the need for different organisations to develop and maintain overlapping and parallel datasets. When properly coordinated, the maintenance of this shared system can be organised in a cost-efficient manner.

At its core, the model operates by dividing municipalities into fine-grained base units, which can then be flexibly aggregated into small areas and other types of statistical or functional geospatial classifications. This modular structure enables the construction of multiple geospatial divisions from a single, consistent foundation.

Implementation of the model

Small-area division model has been developed since 2023 in projects funded by Eurostat. However, ensuring the continuity of this work requires its adoption at the national level.

The implementation of the model can be understood in two stages. In the first phase, the aim is to establish a minimum viable foundation. This involves formally adopting the small-area division developed in the project, designating a responsible authority for its maintenance, and securing permanent baseline funding. In addition, the geospatial division should be made available as an open and well-documented dataset.

In the second phase, which represents the recommended level of implementation, the model is integrated into the national data and geospatial infrastructure. At this stage, governance structures and responsibilities of maintenance are defined on a statutory basis, and interoperability is ensured through the use of national coding systems and universal identifiers. Furthermore, services should be developed to provide both data producers and users with access to geospatial division datasets that meet diverse needs across different user groups.

Phase 1: Establishment (minimum level)

- Officially adopt the developed small-area division
- Assign a responsible authority
- Secure permanent funding
- Publish the division as open and documented data

Phase 2: Integration into national data and geospatial infrastructure (recommended level)

- Define governance and responsibilities legislatively
- Ensure interoperability using national code systems and universal identifiers

Provide services enabling access to geospatial datasets for various user groups

Policy recommendations for establishing the model

The establishment and long-term functioning of a unified geospatial division model requires clear institutional arrangements.

First, the maintenance and development of geospatial boundary datasets must be defined as statutory responsibilities. At the same time, roles, responsibilities, and decision-making processes across different administrative sectors must be clearly specified. Because the benefits of such a system are distributed across multiple sectors, long-term funding should be secured centrally to ensure sustained development and maintenance.

Second, organisations responsible for geospatial divisions must ensure that the necessary infrastructure is organised at the national level. This includes providing services that enable a unified foundation for the diverse spatial data needs of different administrative sectors. The development and maintenance of geospatial divisions should be based on close cooperation between data-producing organisations. A key guiding principle should be that geospatial divisions are produced once but used widely, thereby avoiding duplication of effort.

Third, the role of central government is essential in ensuring the effective utilisation of the model. Ministries should recognise the importance of geospatial divisions within their respective policy domains from three perspectives: operational, normative, and strategic. Operationally, geospatial divisions are needed for data production and the allocation of services; normatively, they are required for legislation and regulatory steering; and strategically, they support impact assessment and long-term planning. A crucial task is therefore to identify those statutory functions and decision-making contexts in which geospatial divisions are required.

Conclusion

A unified national small-area division represents an investment in area-based data that supports the provision of equal services, the production of reliable statistics, and improved decision-making across all administrative sectors.

By replacing fragmented geospatial divisions with a single, coherent system, it eliminates inefficiencies, strengthens data protection, and creates a common foundation for information services, analytics, and research. Without such a foundation, area-based data will continue to deteriorate, weakening the ability to allocate services and resources effectively.

The development of a national small-area system is therefore a key element of Finland's future data infrastructure and a necessary condition for effective, knowledge-based governance in the coming decades.