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SPATIAL PLANNING IN SUPPORTING VILLAGE DEVELOPMENT

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ABSTRACT

Planning degrees have been focusing on rural studies, which make the best planning system for prevailing social welfare in villages. While village governments know development studies by demographic data in tabulation to evaluate/design the planning policies better or not. Different rural study models have been enriched and implemented in the past time. We use GIS to prove planning measures to be effective in rural governance to expand the decision-making process in planning policies. The participation/action research experienced a targeted planning policy in Covid 19 at Langensari-Lembang, Indonesia, found a method of static to dynamic, aggregated to disaggregated, and macro to micro. The results can visualize planning support in general solutions to specific adjustments of some public goods. Covid 19- suitable indicator schemes can design in isolated areas. Targets are how population aggregation and household mobilities in rural areas are affected by these planning policies. We believe action research improvements will employ a practical future on big data and artificial intelligence.

Keyword: *Spatial Planning, GIS, Decision Making*

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1. Environment and its Spatial Distribution

Rural systems have already interconnected based on agricultural sources: water, access to market, and public spaces. Classic intuition defined a dynamic system for recognizable patterns of spatial distance to beneficial interaction. Many economic, social, and anthropology aspects can help understand Kampong's growth. Its nature is a spatial process and past behavior without social engineering by public policy.

Spatial distributions represented a rule-based decision process through co-existing values and life parameters. The effectiveness used to be represented by nature simulation, not by agent-based and analytical modeling. Nature simulation contains planning parameters with population range on each cell. The environment might be stable and correspondingly conclude on agent behavior. The boundary change needs to be constant and will be imported from GIS data (see Figure 1). Geospatial technologies such as remote sensing, GPS, and GIS have been also applied [1]. Spatial analysis using machine learning and GIS has been used for analyzing socio-geospatial factors [2]. GIS and agent-based modelling even has been used for Hajj crowd modelling [3]. Spatial mitigation planning with GIS and public participation even has been conducted in Bangladesh to anticipate Arsenic poisoning [4].

Covid 19 protocols need initial data, spatial patterns, and mobility rates. Cell development can be simulated in the situational loop. The simulation result can be calculated by statistical analysis to expose the population density. Infected cases can give a choice of protocol in subdistricts in the region. The solution can not be declared by the standard answer but is also influenced by social and economic data.

The problem of Covid 19 always makes a solution on the isolated region or zero mobility without social and economic access. Spatial planning must search the emergency access to social and economic access. A high proportion of emergency access will be constrained by its functional zoning. Economic access can be translated as an opportunity to work or financial safety net and reach food sources. It was scarce when the pandemic infiltrated.

According to the characteristics of Covid 19 pandemic, functional zoning is classified to the suitable grade of subdistrict selected. Excluding the subdistrict is strictly prohibited by the corresponding Covid 19 protocols, and socio-economic supply chains do not suit emergency access. The subdistrict is classified into four possible sections: very suitable, relatively realistic, logically realistic, and unrealistic. The evaluation results are modified by the opportunity to mode choice for emergency access.

Figure 1. GIS Data

2. Case Study Area

The peak of the coronavirus pandemic at Langensari Village happened in the middle of 2021. The Situations based on the figure of death rate increased persistently. The policy was made by tabulating cases in the ordinary by district degree, not responding to the changing data at the subdistrict. The policy will be sharp with specific interventions in subdistrict regions. The uniqueness of each area will be essential to investigate the population's mobility and suitability for good territory spatial planning. The action research respectively collected GIS data: primary households, community spots, and pandemic records. We could meet situations that, as the constraint threshold of emergency access we set, the spatial planning must suit health technology and security factors. Although constraints by agglomeration of cases could be classified as socio-economic factors for corona protocols for rural spatial dynamics, the framework works as elastic correction adjustment indicators.

2.1. Frameworks and Parameters

First, according to the coronavirus protocols, a suitable grade of emergency access to food and work is selected. Excluding the areas strictly happened, covid 19 pandemic that's damaged the subdistrict region. Secondly, the evaluation of each factor is mainly set concerning the future strategic health deployment and the characteristics of the pandemic capacity of different subdistrict modes. Finally, the scale and type of the coronavirus protocols are obtained. It can be seen that emergency access is available for spatial planning. It's minimal, and there is a situation of structural adequacy. In spatial planning, we need to coordinate various relations, such as occupation, sickness, and protection protocols, to make a better strategy.

We introduce how to simulate rural spatial dynamics with the development of information technology developed. It makes the simulation can better serve spatial planning practices. We consider different driving parameters, or we say them constraints of emergency access. The spatial conditions still need to be improved in reflecting the carrying capacity of rural resources. Rural spatial dynamic is a process that requires time as a basis will match to future goals.

The parameters required for the simulation reflect the historical mechanisms and consider the future effects of public policy intervention. This is an awareness of whether a model can be used for spatial planning policy. We introduce how to simulate covid 19 protocol process affected by spatial planning. In the model, carrying sickness and population aggregation has been simulated on population scale and density. While the population aggregate, firstly, need to design a residential block with one-stop services. We will also use a case study to introduce how we execute in simulating household residential blocking to forecast the proposed intervention effectiveness on future regeneration.

2.2. Context

Residential mobility is always a particular concern in pandemic cases. The action research manages the interactive process of residential mobility, sick carriers, and access to food & work (money) during the peak of pandemics. In this period, residential mobility has always become a carrier for sprawling during pandemics. In the meantime, interactive commuting becomes a correlated factor with residential mobility. Some spatial patterns have been concerned with the segregation phenomenon.

The planning intervention will accelerate human residential behavior and spatial feedback. Facing a planning strategy, a policy intervention induces residential behavior to support policy decision-making. The whole framework consists of three points: dataset preparedness, simulating a model, and validation/confirmation. To test the probability

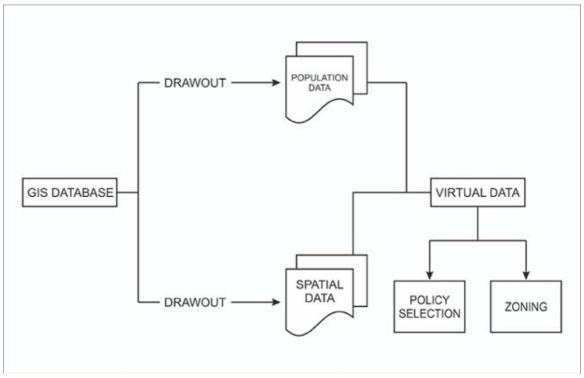


Figure 2. GIS Database

of showing decision-making the impact of covid 19 protocols using the intervention-based solution model, assumed rural space has been inferred to induce spatial planning (see Figure 2).

3. Discussion

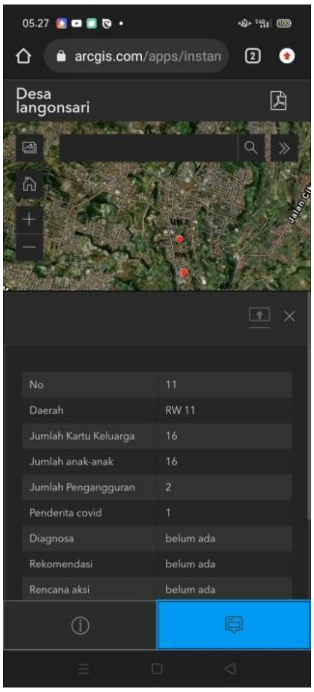
The prepared data set will be fed into the model to simulate household residential mobility. During executing the model, we can examine the spatial planning of household mobility, and the model can calculate the statistical results of emergency access that moved to solutions. The reason for iterating the statistic results is to support whether the selected policy contributes to accelerating solutions to revitalize rural spatial planning. The simulation output can be checked with the actual data of the case. And last, the stable process will be adopted as a framework with model validation.

Dataset preparation uses GIS. We make the virtual space with the environment as the simulation platform. The dataset creates spatial information such as population agglomeration, control area, access zoning, and policy suitability. Household information in population density, population ages, household numbers, etc., is presented in each cell of spatial space. These spatial, socio-economical, and emergency access features should be mature with the decision-making features. The characteristics will be prepared with the spatial attributes for behavior cells (see Table 1).

Table 1. Global and Specific Parameters

MAIN PARAMETER	SPECIFIC PARAMETERS	PREDEFINED DATA
GLOBAL PARAMETER	BIRTH DATE DEATH DATE THRESHOLD POLICY SCENARIO OPTION PARAMETER FOR SETTING	NUMBERS IN VARIOUS DISTRIBUTION IN SIMULATION MODEL
ATTRIBUTES OF VIRTUAL SPACE	PANDEMIC ZONING HOUSEHOLD DENSITY PLANNING AREAS	EVALUATED BASED ON ZONING
ATTRIBUTES OF HOUSEHOLD	INCOME SAVING EMPLOYMENT LOCATION	CELL INFORMATION

The datasets are gained from GIS and converted into raster by ArcGIS to create a spatial Rata set. Our simulation needs exposure to the relationship between census surveys and spatial information. It's a virtual rural space consisting of the number and attributes of households. Characteristics of households are generated by zone density. All data will be inserted into the simulation to support the decision-making for covid 19 protocols (see Figure 3).



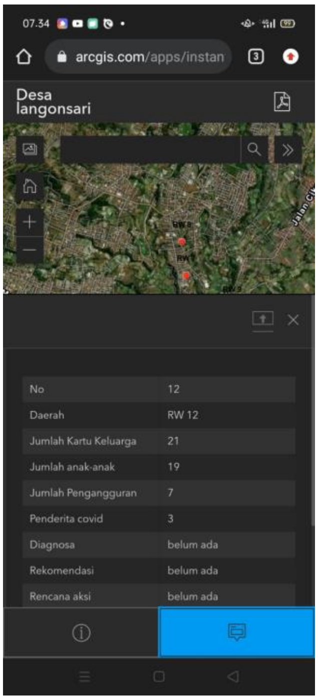


Figure 3. GIS Completed

4. Conclusions

The parameters for Covid 19 protocols are the contrary between residential mobility and emergency access. These parameters could be divided into global parameters related to global variables of the simulation model, spatial attributes related to the simulation environment, and carriers' attributes related to sickness carriers.

This simulation pays more and more attention to policy sides. These kinds of policies have affluent ingredients and stand for lower-higher levels. The primary strategy of this spatial policy is making emergency access to increase access to work and food.

When we develop a Covid 19 protocols for policy analysis or decision-making ingredients, the interactions between residential mobility and policy information sharing happen. This policy-sharing reconstruction will further influence covid 19 protocols. This kind of positive feedback will affect the policy's utilization and vice versa.

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