JRSSEM 2022, Vol. 01, No. 7, 870 – 890
E-ISSN: 2807 - 6311, P-ISSN: 2807 - 6494

INTEGRATION STRATEGY OF GREEN CITY DEVELOPMENT WITH THE INDRAGIRI ROKAN RIVER FLOW AREA IN THE CAPITAL AREA OF SOLOK REGENCY "AROSUKA"

Gusmal[1*]
Agus Irianto[2]
[1]Program in Environmental Economics, Padang State University
[2]Faculty of Economics, Padang State University
e-mail: gusmal@gmail.com[1], agus.irianto@gmail.com[2]
*Correspondence: gusmal@gmail.co

Submitted: 25 January 2022, Revised: 06 February 2022, Accepted: 20 February 2022

Abstract. This study formulates a green city development strategy in the capital city of Solok Regency in the "Arosuka" area. The strategy in question is an integration strategy where this area has its own uniqueness because it is located in the Indragiri Rokan Catchment Area. The development of an environmentally friendly city is usually associated with waste management, slum settlements, architecture, sustainable development and other issues, but this article focuses on efforts to maintain groundwater discharge in Arosuka in connection with the change in the status of the Catchment Area area to become the capital of an integrated shark Catchment Area city. The data used is secondary data in the form of a regency capital development plan, Catchment Area and Arosuka area data. The research method uses a descriptive qualitative approach. The results of the study indicate that there are 5 strategies for structuring the Arosuka area so that it is expected to become a green city in the Indragiri Rokan Catchment Area.

Keywords: integration; green city; catchment area; arosuka.

DOI : 10.36418/jrssem.v1i7.68

INTRODUCTION

One of the areas currently developing this new area includes the Regency Capital Solok, namely Arosuka which is located in 2 Nagari (villages), namely Koto Gaek Guguk and Batang Barus, Gunung Talang District, precisely in Jorong Sukarami Nagari, Koto Gaek Guguk and Jorong Kayu Aro Nagari. Barus Trunk.

The Arosuka area is located on surface runoff in the Batang Dareh, Baliang and Lubuk Selasih river areas which are part of the Batang Sumani Catchment Area. The drainage pattern of natural ditches or creeks is dendritic (meander), drainage formed due to the influence of relief or wavy physiography. This phenomenon is characterized by the form of a winding flow (Ho et al., 2016), the current is quite heavy with an intermittent flow system.

The development of this area also pays attention to environmental aspects so as to create an environmentally friendly area or city (Denis, Cysek-Pawlak, Krzysztofik, & Majewska, 2021). If this huge potential is not accompanied by a spatial planning and utilization planning process, the potentials that should have had a positive impact have turned into a negative impact, as is the case in many other regions in Indonesia (Ayompe, Schaafsma, & Egoh, 2021). Therefore we need an integrated city development concept. In connection with the conditions and potential of the Arosuka Area which was developed as the (Regency Capital) of Solok, the concept of a Green City in an integrated Catchment Area is thought to be feasible (Kabisch & Haase, 2014). The advantage of the Green City concept is that it can meet the needs of the existence of Green Open Space (RTH) in an area (Indriyani, Sabaruddin, Rianse, & Baco, 2016), so that it can reduce and even solve environmental problems, natural disasters, low air pollution, flood free, low noise and other environmental problems (Handy & Maulana, 2021). As the capital of Solok Regency, as explained in the previous section, there is a uniqueness in that this area is located in a Catchment Area, namely the Indragiri Rokan River.

In terms of growth, the Arosuka area has a lot of potential from various sectors such as agriculture and plantations, tourism, and other agribusiness activities. These potentials will eventually become an attraction for various types of economic activity which will later cause a multiplayer effect.

Green City is one of the concepts of a sustainable urban planning approach (Trisno & Lianto, 2019). Green Cities are also known as Ecological Cities or healthy cities. This means that there is a balance between urban development and development with environmental sustainability. A healthy city can create a city that is safe, comfortable, clean, and healthy for its residents to live in by optimizing the socio-economic potential of the community through empowering community forums, facilitated by related sectors and in sync with urban planning. To be able to make it happen, it takes effort from every individual member of the community and all related parties (stakeholders). It can also be said that a green city is an ecologically healthy city. A green city must be understood as a city that utilizes water and energy resources effectively and efficiently, reduces waste,

DOI : 10.36418/jrssem.v1i7.68

implements an integrated transportation system, ensures environmental health, and synergizes the natural and artificial environment. A green city or green city is an urban concept, where environmental, economic, and socio-cultural issues (local wisdom) must be balanced for a better future generation (Hasanah & Nulhakim, 2015).

Haeruman said that the integration in the management of activities must be able to create: (1) the coordination of the managers of an object that is interrelated in a system to achieve a harmony of goals; (2) integrate every effort to utilize the arrangement, maintenance, supervision and control as well as development based on the element of linkage or dependence of the object being managed. (Álvarez-Romero, Pressey, Ban, & Brodie, 2015) said that Catchment Area management is an applied science for the protection, improvement and management of Catchment Areas, and its basic object is to increase water supply, reduce maximum and minimum flow ranges, reduce sediment yields and improve water quality for various uses.

Catchment Area is a unified ecosystem (Chen et al., 2021), therefore in monitoring and evaluation activities, Catchment Area management should be carried out in an integrated and comprehensive manner. Catchment Area managed in an integrated manner (Integrated Catchment Area Management) is a process of formulation and implementation of an activity involving the management of Natural Resources (SDA) and humans in a Catchment Area by considering social, political, economic and institutional aspects in the Catchment Area and around the Catchment Area to achieve certain social goals. 2 Catchment Areas have become the focus of environmental management as a result of environmental degradation that occurs is indicated by soil erosion and sedimentation, especially due to deforestation in the form of forest conversion to other uses (Pawitan, 2011).

The importance of the position of the Catchment Area as a comprehensive planning unit is a logical consequence to maintain the sustainable use of forest, land and water resources (Dolega, Pavlis, & Singleton, 2016). Inaccurate planning can lead to Catchment Area To calculate the need for public green open space in the planning area, the method of calculating the need for green open space is based on a percentage which is then linked to the latest policy, namely Law no. 26 of 2007 concerning Spatial Planning. that is:

Degradation which can lead to bad consequences as stated above (Wu et al., 2019). In an effort to create an integrated Catchment Area management approach, an integrated, comprehensive, sustainable and environmentally friendly planning is required by considering the Catchment Area as a management unit. Thus, if there is a disaster, whether it is a flood or a drought, the response can be carried out comprehensively covering the Catchment Area from upstream to downstream.

The proportion of green open space in the city area is at least 30 (thirty) percent of the city area. 20 (twenty) percent of public green open space and 10 (ten) percent of private green open space. Then the calculation of RTH is as follows:

a. Arosuka Urban Area Planning Area: 1,682.1 Ha

b. Standard : Law No.26 of 2007 on Spatial Planning (Green space area = 30% of the city area).
c. The need for green open space in the Talawi area according to the standards of Law no. 26 of 2007: 30% of 1,682.1 Ha = 504.63 Ha.
d. The need for green open space (public area) for the Silungkang area according to the standards of Law no. 26 of 2007: 20% of 504.83 Ha = 100.93 Ha.
e. To fulfill the need for land for the Designation of Green Open Space (RTH) efforts are made from the existence of city parks in the Arosuka Area along with the Border Area and the need for city parks.

METHODS

In this study, the strategy used is a strategy empirical method consisting of a case study domain or case study. As has been stated explicitly in the title of the study, this research has an exploratory nature which has wide open problems and no hypothesis yet. The research method used is descriptive survey methods because the data obtained will come from direct observations in the field. Descriptive method is used to describe, identify, and analyze the concept of green architecture found in the residential area of the Brantas Catchment Area, Penanggungan Village, Malang as the object of study.

Data collection in this study begins with observing the elements that make up settlements in the form of the natural environment, protection, and networks/networks, throughout the research area followed by observations and documentation/surveys to the field to directly observe the actual situation and conditions. At this observation stage, observations and recordings of green city development strategies in the Catchment Area found in the research location were carried out. The next step is to identify the data into various elements forming regional integration as well as modernization theory. After that, the grouping results are analyzed based on the parameters of an environmentally friendly green city by looking at the aspects of the Green City Management Conception, Catchment Area Management Conception, Regency Capital Management Conception and Integrated Area Conception.

RESULTS AND DISCUSSION

The objectives of developing the Arosuka Area in the long term are: "The realization of the Arosuka Area as a Park City that becomes the Core of the Capital Based on: a harmonious, comfortable and environmentally friendly trade, office and residential area by maintaining the Catchment Area function".

Arosuka Area Development Policies in the Long Term are :

1. Improvement and development of the area that is directed as a garden city
2. Improvement and development of the function of the area which is directed as a center of economic development.
3. Improvement and development of service centers as centers of productive and efficient activities.
4. Improving the quality and coverage of urban infrastructure network services in an integrated and equitable manner in

all regions;

5. Increasing cultivation activities in an integrated and harmonious manner by taking into account the carrying capacity of the environment;
6. Increasing the function and quality of the area in order to maintain the function of the Catchment Area;
7. Improved coordination, integration, and synchronization of regional development through inter-regional cooperation, stakeholder partnerships, and strengthening the role of the community.

In the context of the development of Solok Regency, the Arosuka Region plays a very important role both in terms of regional economic growth and in the function of socio-economic services and government. The existence of the Arosuka Area, which is traversed by the Padang-Solok Crossing, is an important asset that can support the wider collection and distribution function which is expected to counter growth in the border area. The role of collection and distribution does not only cover Solok Regency but can act as one of the collection and distribution centers in West Sumatra Province. In the context of public services, the service capacity will be increased to cover the entire Solok Regency.

When viewed from the function and role of the Arosuka Area, it is an area: the Solok Regency Government Center, the Center for Economic Activities (trade and services), the Collection and Distribution Center concerning the agricultural and plantation sectors, tourism and other agribusiness activities which are the potential of the Arosuka Area, the Center for Collection and distribution related to the regional transportation system and social service centers for the people of Gunung Talang District and Solok District.

Supporting Factors :

a. Physical Aspects (Administrative Boundaries, Topography, Land Requirements, Geology, Morphology, Climatology, Hydrology, Land Use, Disaster Vulnerability, Plant Types
b. Population
c. Condition of Urban Facilities (Clean Water, Electricity Network, Communication Network, Telephone Network, Road Network, Solid Waste System, Drainage Network,
d. Regional Development in Regional Constellation
e. Policy Support

Legal Aspect

Regarding the transfer of the capital city of Solok Regency to Arosuka, it has been regulated by Government Regulation (PP) of the Republic of Indonesia number 39 of 2004. The PP stated that the Capital of Solok Regency was moved from Solok City to Arosuka in the Gunung Talang District, Solok Regency. The boundaries of the Arosuka region to the north and east are Nagari Koto Gaek, and to the south and west are Nagari Batang Barus. From this potential, Arosuka deserves to be appointed as a model for an environmentally friendly city approach. 26 Article 8 paragraph 1 states that the realization and improvement of integration, and activities between cultivation activities, and control of cultivation development so as not to

exceed the carrying capacity and capacity of the environment.

Integration Strategy

Ideally, a Catchment Area (Catchment Area) needs an open space with plants that help infiltration and percolation, with little evaporation. This is what needs to be considered in the development of the Arosuka Area into the new (Regency Capital) of Solok. The development of a city in an area must be well thought out and planned. In relation to the relocation of the capital city, the development of a new city is a long-term design and scenario with the aim of creating new growth centers. stems (stemflow), and rainwater directly reaches the ground surface and is then divided into runoff, evaporation, and infiltration water. The combination of evaporation of water vapor resulting from the processes of transpiration and interception is called evapotranspiration. While running water and infiltration water will flow into the river as discharge.

Currently, the water discharge in the Solok Regency Capital Region in Arosuka is 30 l/second. This groundwater is obtained from springs of very good quality and even suitable for bottled drinking water. This 30 liter water debit is even sufficient to meet the needs of 2,800 house connections (SR) in three areas that are an integral part of Arosuka as Solok, namely the Samsat housing area, offices, and indigenous people.

The development of urban areas often brings problems to the area, both the transportation system and environmental issues. Therefore, it is necessary to have urban planning so that the quality of balance in the city is needed. The balance of urban planning can be seen from the existence of green and non-green areas in order to achieve a livable city. The green area becomes important because it becomes a source of oxygen and water absorption in the area. The district spatial planning policy is the direction of regional development determined by the district government in order to achieve the district spatial planning goal within a period of 20 (twenty) years.

The district spatial planning policy is a direction of action that must be determined to achieve the district's spatial planning objectives. The district spatial planning policy functions as:

a. As a basis for formulating district spatial planning strategies;
b. As a basis for formulating the structure and spatial pattern of the district;
c. Provide direction for the preparation of the main program indications in the district RTRW;
d. As the basis for determining the directives for controlling the use of district space.

With the framework of achieving the objectives of spatial planning for the district, the formulation of the spatial planning policy of Solok Regency is as follows:

a. Development of an efficient district spatial organization through a hierarchical arrangement of activity centers covering the entire district area
b. Development of network systems and infrastructure nodes that integrate all district activity centers and their hinterland rural systems and provide services for as many settlements as

possible in the district

c. Consolidation of protected areas in the Solok Regency area that has been determined in the Provincial RTRWN and RTRW and adding protected areas under the authority of the Regency
d. Cultivation area management supports economic development through sustainable natural resource management based on agriculture, plantations, tourism, and industry
e. The embodiment of efforts to change the function of forest areas to non-forest areas for cultivation areas needed for the benefit of district development in accordance with applicable provisions and regulations (PP No. 10/2010 concerning Procedures for Changes in Forest Area Designations and Functions).

The district spatial planning strategy is the elaboration of district spatial planning policies into operational steps to achieve the goals that have been set.

The district spatial planning strategy functions to:

a. As a basis for the preparation of spatial structure plans, spatial pattern plans, and determination of district strategic areas;
b. Provide direction for the preparation of the main program indications in the district RTRW;
c. As the basis for determining the directives for controlling the use of district space.

As a derivative of the spatial planning policy formulation which is described in a more operational manner, the Solok Regency spatial planning strategy is as follows:

1. Strategies that need to be carried out in the context of "*Developing An Efficient District Spatial Organization Through A Hierarchical Arrangement of Activity Centers Covering The Entire District Area*" are:
   a. Develop one district main activity center (PKL) in accordance with the RTRWP direction and promote other main centers according to their potential;
   b. Establish at least 1 (one) activity center as the Regional Development Center (PPK) in each sub-district;
   c. Establish an activity center/settlement center that has an inter-village service area and or more than one village as an Environmental Service Center (PPL), other than those that have been designated as a Regional Development Center (PPK); and
   d. Establish a settlement center that has a service level close to the activity center above it, promoted to an activity center above it (PKLp, PPKp, PPLp).
2. The strategy for "*Development of A Network System And Infrastructure Nodes That Integrates All District Activity Centers and Their Hinterland Rural Systems and Provides Services For as Many Settlements as Possible an The District*" is:
   a. Support the development of an access road network to Solok Regency in accordance with National and Provincial policies as well as the development of new road pioneers to/from Solok

Regency with other adjoining regencies/cities;
b. Develop multi-access roads to and from the activity center that integrates all districts;
c. Support the development of the West Sumatra National and Provincial Railway network system that crosses the Solok Regency area;
d. Develop a water transportation system in Singkarak Lake, Above Lake and Lower Lake to support regional economic activities and tourism;
e. Develop an Energy/Electricity Network System to meet electricity needs in all sub-districts in the Solok Regency area;
f. Develop a cellular telecommunications network system that serves the entire area of Solok Regency and improve cable telecommunications networks, especially for industrial activity services at the Regency Main Activity Centers (PKL and PKLp);
g. Develop a raw water network system to meet drinking water needs at the district's main activity centers (PKL and PKLp) and for areas where water is scarce, as well as develop district irrigation networks (primary-secondary-tertiary) in areas with potential for wetland agriculture;
h. Develop a Regional TPA in collaboration with the City of Padang and adjacent regencies within Metropolitan Padang and its surroundings;
i. Develop economic infrastructure at activity centers and service centers according to the level and area of service;
j. Develop socio-cultural infrastructure, worship, health, and sports to support the comfortable and sustainable socio-cultural life of the community;

3. The strategy for *"Consolidating protected areas in the Solok Regency area that has been stipulated in the RTRWN and Provincial RTRW and adding protected areas under the authority of the Regency***"** are:
   a. Maintaining the existing protected areas and in accordance with the RTRWN and RTRWP;
   b. Restore the protected function for protected areas that have been determined in the RTRWN and RTRWP that have undergone changes in non-protected use, as long as the terms and conditions as protected areas are met in accordance with Government Regulation No. 10/2010 concerning Procedures for Changes in Designation and Functions of Forest Areas;
   c. Develop district-scale protected areas in accordance with the potential functions that exist in the area; and
   d. Strive to maintain a forest area of at least 30% of each Catchment Area in the entire Regency area.
4. The strategy for *"Management of cultivation areas supports economic development through sustainable natural resource management based on*

agriculture, plantations, tourism, and urban forest industry" are:

a. Developing agricultural cultivation areas is directed at maintaining Solok Regency as part of the National and West Sumatra Province rice granaries through intensification and extensification of agricultural land;
b. Developing plantation cultivation areas is directed at developing the productive economy of the region that has a high power to boost productivity and regional economic growth;
c. Developing a tourism area is directed at increasing the comfort of people's lives as well as being part of the productive economic development of the region that can stimulate productive economic activities within the tourist area and the wider area within the district;
d. Developing an industrial designation area directed to the natural resource potential management industry to increase added value and regional productivity, in a sustainable manner;
e. Developing residential areas is directed to support the development of activity centers and service centers that are spread out as per the Regency Area Spatial Structure Plan;
f. Developing forest cultivation areas is directed to be able to stimulate the economic activities of communities around forest areas and increase the productivity of district areas in the forestry sector;
g. Develop mining areas for the management of natural resource potential in a balanced and sustainable manner by prioritizing aspects of ecosystem balance and environmental conservation;

5. The strategy for *"The realization of a business for changing the function of a forest area to a non-forest area for cultivation areas needed for the benefit of district development in accordance with applicable provisions and regulations (PP No. 10/2010 concerning Procedures for Changes in the Designation and Functions of Forest Areas)"* are:
   a. Redefine the forest area included in the cultivation area in Solok Regency, as in the West Sumatra RTRWP which has been approved by the Minister of Forestry; and
   b. Realizing the management of the area that has been approved by the Minister of Forestry as an area released from forest area, as much as possible for the development of a productive economy based on agriculture, plantation, tourism and industry-based communities.

The urban system development plan is intended to describe the role and function of each city in the overall development of the area within the Solok Regency. Its development is carried out through the establishment of activity centers which are determined hierarchically according to the potential of each activity center or based on the direction of development policies. That is, the determination according to the

potential is based on the current (existing) conditions, both concerning human resources, natural resources and artificial resources; while the direction of development policy is based on the objectives to be achieved through the development of an activity center with future development plans within the planning period, namely the next 20 (twenty) years.

The Arosuka area as a Park City which is the core of the Regency Capital is understood as an area to create a city that is friendly to the environment. Taking into account that the population is the content of the object and subject of development, it is better to plan a garden city according to the population and activities of an urban area such as the Arosuka area as a Park City which is the Core of the Capital based on a harmonious trading area, offices and settlements, comfortable and environmentally friendly. At the same time as a track area and/or transit area for district and regional movements as a corridor for the Padang City Metropolitan area. In addition, the Arosuka urban area must have complete facilities and infrastructure as a place for "melting" various kinds of activities, places for interaction, recreation, and gathering of local communities.

"*The realization of the Arosuka Area as a Park City that Becomes the Core of the Capital in the Detailed Spatial Plan for the Arosuka Regency Capital Region is an effort to develop a liveable urban environment that provides opportunities for the user community to adapt, integrate and interact socially, also aims to improve the ability of the community to adapt, integrate and interact socially"*. The area's land can be utilized in accordance with the highest and the best use of the area's land that is environmentally sound, so that it can provide even better benefits for the Arosuka Region in particular and Solok Regency in general with the aim of:

a. Maintaining the harmony and balance of environmental ecosystems urban;
b. Creating a balance between the natural environment and the artificial environment in urban areas and
c. Improving the quality of a healthy, beautiful, clean and comfortable urban environment.

To ensure the success of affirming and creating the image of this area, it is necessary to pay attention to several important elements in its physical planning and design, namely: theme, image, authenticity, function, public perception needs, financial feasibility, environmental assessment, construction technology and effective management.

In the planning area, the image formed is expected to reflect the image of the park city area, the image of the office area, the image of the trade area, the cultural area, the image of the tourist and entertainment area. To achieve the realization of the proclaimed scenario, a series of strategies for structuring buildings and the regional environment have been drawn up, including:

1. Formation of regional structure.
2. Creation of control blocks that have certain themes.
3. Regulating the regional movement system and characterizing the existing road corridors in the area.
4. Assign nodes to the region.
5. Arrange street pictures in each significant road corridor.
6. Creating a visual linkage to the city park as a binding element that links various thematic zones, blocks and activities within the area.
7. Creating a park-image in the area to give a green, beautiful and comfortable feel.

Affirming the image of the Arosuka area, Solok Regency as a Regency Park City area, as well as functioning optimally and efficiently, essentially requires improvement and realignment starting from the structure of the area.

The development of the Solok Regency regional structure provides direction in the use and development of regional space in general, taking into account several aspects, including:

Determination of the regional structure to link each function and activity through planning the link system and regional movement as well as strengthening the path of achievement to a location.

Determination of control blocks within the area. Allocating functions and activities focused on developing transit, promotion and entertainment functions within the area with clear boundaries in their utilization, development and development. Regional infrastructure system planning that supports regional functions and images that are integrated with a link system. Regional structures that can lead to creating regional images through building arrangement, open space and green planning, orientation and information systems.

The main concept of developing the structure of the garden city area of Solok Regency is the realignment of a linear structure in which all movements and functions of the area are oriented to the main road line into a compact regional structure and are directed to have regional design quality values, as follows:

1) Integration

Encouraging the growth of diverse activities in an integrated manner in an adequate container within the planning area, so that the value of the area's land and the vitality of the area (especially those that are functionally and geographically very central) can be optimally increased.

Improving the circulation system, especially in the planning area so that the level of achievement is better and the possibility of implementing better circulation arrangements through a clear separation of various activities and circulation modes that occur in the planning area.

2) Functional Efficiency

Ease of access and achievement to various facilities within reach of both vehicle and pedestrian circulation. Availability of infrastructure and service

facilities (stock availability), the availability of several supporting facilities for activities in the area.

Procurement of infrastructure and utility systems that are more efficient and economical in the planning area so that optimization and productivity of land use can be achieved.

3) **Environmental Harmony**

Achieving a certain level of environmental quality (Physical Environmental Quality).

4) **Sense Of Place**

Provides a flexible space framework for building and environmental design innovations in the Arosuka Area, Solok Regency so that this area has a distinctive image or character as a Park City, so that this area can become a landmark of Solok Regency.

5) **Commercial viability**

Controlling land use directed so that the area's land capability can be utilized in accordance with the highest and the best use of the area's land so that it can provide even better benefits for the area.

Based on the 5 values of the quality of the regional structure design, the structure of the Arosuka area in Solok Regency was developed and designed through the application of the Transit Oriented Development (TOD) concept. In general, TOD is defined as an area with a density level controlled by mixed use. consisting of housing, workplaces, shopping, and social facilities that are located 'near' or within easy reach of a transit center (terminal) based on a green line that functions as a park. This area is specially designed with connecting access between existing land use types through pedestrian facilities, bicycles and as little access as possible by motorized vehicles.

The location of Arosuka, Solok Regency, which is crossed by the Padang - Solok Regency - Solok Primary arterial road - and the existence of a terminal that will be planned in the planning area make it very strategic because it is at the point of transition of transportation modes (regional transportation to local transportation and vice versa). With this condition, those who shop and work in the Arosuka area are not only local residents, but also residents from the surrounding area and other areas connected by the primary arterial road.

With the existence of a Terminal plan in the planning area, supported by the development of transit facilities, promotions and entertainment, there is potential for the application of the transit-oriented development concept. With the existence of these transportation centers and commercial centers, resulting in a very high movement, either by using private transportation modes (cars and motorbikes), or especially by public/mass transportation (buses, district transportation, motorcycle taxis) or walking. feet (without the medium of transportation mode). At certain points there is a change in the mode of transportation so that it becomes a place to meet and gather

many people. This transition point by itself has the potential to become a stopover or destination, so that in the surrounding location can be placed commercial activities, offices, recreation, and residences.

Things that must be considered in regional development using the Transit Oriented Development approach are Density (Papa & Bertolini, 2015), where the density of the development area related to the service radius of the transit point must be high enough, Diversity, which must have various functions in the area (mix-use) and integrated designs with one another. TOD is an area development concept that is oriented towards transit points, namely locations where mass public transport stops.

In this paradigm, public transportation is the backbone of human movement. Public transport transit points become the starting point for human movement to reach their respective goals. The determination of the zoning of these functions is based on the generation of movement of each type of function and the range that can be reached by pedestrians (comfortable range in Indonesia is ± 400 m to a maximum of 600 m). Functions that generate high movement generation, especially commercial functions, are located closer to the transit point, while residential functions can be located at a greater distance.

In addition, there are several principles that must be considered in designing the area through the application of the TOD concept, namely :

Integration of transit functions with the development of the surrounding area (Li et al., 2019). Functions such as commercial, residential, office, open space must be easily accessible from the transit point of the area (terminal) with a distance that is still comfortable to walk (about 5 minutes on foot or within a radius of 5 minutes). maximum 600 m). Creation of comfortable and integrated walking paths with functions within the TOD development area.Providing varied housing based on type, density and rental price.Creation of public open space as one of the binding spaces between building masses which will be the orientation the mass of buildings in the area as well as a place for public activities and recreation. Carrying out new developments along transit lines that are combined with existing buildings in the area. Certain distance or radius from the locati on of the transit function (terminal) which is considered the core location. Each layer will determine the type of designation and the intensity of its construction.

In a more macro context or in the context of the Regency area (Densiana, 2022), the central government area of Arosuka which was developed by applying the TOD concept as a garden city will become a secondary activity center area that supports the existence of the Regency's main activity center area. The relationship between these two activity centers has become very intensive because of the existence of a movement path that connects the two.

Movement activities and the existence of these two magnets will be a catalyst for the development of areas around the center of activity as well as areas that are crossed by the driveway so that the Regency will become more socio-economically alive.

The planning area has several potentials to be developed by applying the TOD concept, namely:

1. **Transit Point**

   There is a park area (rest area) with a distance of about 600 meters from residential and commercial areas so that there is a potential for developing pedestrianized routes that will drive regional activities.

   There is a main central civic center area which is about 3 km from the terminal area so that it is potential to develop internal mass transportation facilities to support district activities in general.

2. **Density**

   The planning area is an area that has a growth rate that is projected to be fast with commercial activities as the main driving function.

3. **Diversity**

   Diversity of functions in the planning area (mix-use), there are commercial areas of various types (shophouses, markets, retail stores and residential areas, etc).

Green Open Space (RTH)

Green Open Space is required in Law No. 26 of 2007 concerning spatial planning, that the proportion of green open space in the city area is at least 30 (thirty) percent of the city area. 20 (twenty) percent of public green open space and 10 (ten) percent of private green open space.

Green Open Space (RTH) are spaces within a city or wider area, both in the form of an area/area and in the form of an elongated area/lane where in its use it is more open and basically without buildings.

In addition to functioning as the lungs of the city, the green open space area functions as one of the elements forming the urban spatial structure and in the spatial pattern is an area that can function to support the protected function. The management of this green open area/space generally includes:

1. Restrictions on the construction of buildings, except those that have very vital functions or buildings that are supporting and become part of the green open space area.
2. Development of green open space as part of the development of public facilities and city/environmental parks
3. Development of green open space areas as a barrier between functional areas and other functional areas in the vicinity, especially residential areas.

Directions for the development of City RTH (Green Open Space) are carried out by taking into account the following aspects:

1. To create a comfortable microclimate in the Arosuka planning area, it is necessary to allocate 30% of the city area as open space with vegetation cover.

   Green Open Space (RTH) can be contributed as follows:

   a. Productive Green Open Space, namely in the form of agricultural and plantation areas
   b. Conservation Green Open Spaces,

such as large forests, urban forests, and catchment areas.

c. Environmental Green Open Space is a city park, environmental park and yard.
d. Corridor green open space, including road network corridors, high tension power lines, with the surrounding area designed with a buffer zone thickness of 100 – 500 meters.
e. Special Green Open Space, which includes public burial places (TPU), office yards, Buffer Zones, educational areas, and tourist/recreation areas.

2. The selection of vegetation types is adjusted to the mission of the type of green open space to be developed, for example in corridor green open space, the selected vegetation type must have a root system that does not damage the shoulders or body of the road and has a branching system that does not cause traffic safety disturbances.

The types of green open space that will be planned in the Arosuka Urban Area are as follows:

Urban Forest

The purpose of the implementation of urban forest is as a buffer for the urban environment that functions to:

1) Improve and maintain the microclimate and aesthetic value;
2) Absorb water;
3) Creating balance and harmony in the physical environment of the city; and
4) Support the preservation and protection of Indonesia's biodiversity.

Urban forests can take the form of:

a. Clumped or piled up: urban forest with vegetation communities concentrated in one area, with a minimum number of vegetation of 100 trees with irregular spacings;
b. Spread: urban forest that does not have a certain shape pattern, with a minimum area of 2500 m2. The vegetation community grows scattered scattered in the form of clumps or small clusters;
c. The area planted with plants (green space) is 90% - 100% of the urban forest area;
d. In the form of paths: urban forests on land in the form of paths following the formation of rivers, roads, and so on. The minimum width of an urban forest in the form of a strip is 30 m.

The structure of the urban forest consists of:

1) Two-story urban forest, which only has a growing community of trees and grasses;
2) Multi-strata urban forest, which has a plant community in addition to trees and grass, there are also shrubs and ground cover with irregular spacing.

The criteria for selecting vegetation for Urban Forests are:

a) Have varying heights;
b) As far as possible a plant that invites the presence of birds;
c) The canopy is quite shady and compact;
d) Capable of absorbing and absorbing air pollution;
e) Resistant to pests and diseases;
f) Long-lived;

g) Tolerant to the limitations of sunlight and water;
h) Resistant to motor vehicle and industrial pollution;
i) Strong trunk and branching system;
j) Strong upright rods, not easily broken;
k) Strong root system so as to prevent landslides;
l) The system produced is sufficient and not allelopathic, so that other plants can grow well as ground cover;
m) The types of plants planted belong to the Evergreen group, not from the deciduous plant group (Decidous);
n) Has deep roots.

City Park Green Open Space

RTH City park is a park that is intended to serve residents of one city or part of the city area. This park serves a minimum of 480,000 residents with a minimum standard of 0.3 m2 per city resident, with a minimum garden area of 144,000 m2. This park can be in the form of green open space (green field), which is equipped with recreational and sports facilities, and a sports complex with a minimum of 80% - 90% green open space. All of these facilities are open to the public. The selected vegetation types in the form of annual trees, shrubs, and shrubs are planted in groups or spread to function as trees creating a micro-climate or as a barrier between activities.

Vegetation selection criteria for environmental parks and city parks are as follows:

1) Non-toxic, not thorny, branches are not easily broken, roots do not interfere with the foundation;
2) The canopy is quite shady and compact, but not too dark;
3) The height of the plants varies, the green color with other color variations is balanced;
4) The stature and shape of the crown is quite beautiful;
5) Moderate growth speed;
6) In the form of habitat for local plants and cultivated plants;
7) Types of annual or seasonal plants;
8) Half-tight spacing so as to produce optimal shade;
9) Resistant to plant pests and diseases;
10) Capable of trapping and absorbing air pollution;
11) As far as possible a plant that invites birds.

Utilization of green open space in residential environments based on type and function

RTH Park Rukun Neighbors. The Neighborhood Community Park (RT) can be used by residents as a place to carry out various social activities within the RT. To support the activities of residents in the environment, facilities that must be provided at least are park benches and children's play facilities. Apart from being a place to carry out social activities, the RTH Taman Rukun Tetangga can also be used as a Community Garden by planting family medicinal plants/living pharmacies, vegetables, and fruits that can be used by residents.

RTH Rukun Warga (RW)

RTH Rukun Warga (RW) can be used for

various youth activities, community sports activities, and other social activities within the RW. The facilities provided are in the form of a field for various activities, both sports and other activities, several park bench units which are installed in groups as a means of communicating and socializing between residents, and several types of children's play buildings that are resistant and safe for use by teenagers.

RTH Kelurahan/village

Urban green space can be used for various activities of residents in one village. This park can be an active park, with the main facilities being a sports field (multipurpose), with a running track around it, or it can be a passive park, where the main activity is more passive activities, such as sitting or relaxing, so that it is more dominated by green space. with annual trees.

District green space

The sub-district green space can be used by residents to carry out various activities within one sub-district. This park can be an active park with a sports field as the main facility, with a running track around it, or it can be a passive park for more passive activities, so that it is more dominated by green space.

a. Green Belt

The green belt is a green open space that functions as a buffer area and to limit the development of a land use (city boundaries, area separators, etc.) or limit one activity to another so as not to interfere with each other, as well as security from surrounding environmental factors. The green belt can be in the form of green open space that extends following the boundaries of a certain area or land use, filled with trees, so that it acts as a barrier or separator;

TPA green belt, Industrial area green belt, border and river green belt; Urban forest; Mixed gardens, plantations, rice fields, which have existed before and through regulations stipulated by law, are maintained. Green belt environmental function; Noise suppression; Reducing the heating effect caused by solar energy radiation.

b. Glare filter;

Overcoming inundation; low-lying areas with poor drainage are often inundated with rainwater which can disrupt city activities and become mosquito breeding grounds;

Windbreak; To build a green belt that functions as a windbreak, several factors need to be taken into account including the length of the lane, the width of the lane.

c. Public Cemetery

The provision of green open space in the burial area besides having a main function as a place for burial of bodies also has an ecological function, namely as a water catchment area, a place for the growth of various types of vegetation, a microclimate creator and a place for birds to live as well as social functions for the surrounding community such as resting and as a source of income.

For the provision of a funeral green space, the provisions for the form of a funeral are as follows:

1) The size of the tomb is 1 m x 2 m;
2) The distance between tombs is at least 0.5 m;
3) Each grave is not allowed to be bricked/paved;
4) The cemetery is divided into several blocks, the area and number of each block is adjusted to the local cemetery conditions;
5) The boundary between the burial blocks is a pedestrian area of 150-200 cm wide with a row of protective trees on one side;
6) The outer boundary of the cemetery is in the form of a hedge or a combination of artificial fences and hedges, or with protective trees;
7) Cemetery green space including unpaved burials of at least 70% of the total burial area with a vegetation coverage level of 80% of the green space area.

d. RTH Green Line Road

For road green lanes, green open space can be provided by placing plants between 20–30% of the road owned space (rumija) according to the road class. To determine the selection of plant species, it is necessary to pay attention to 2 (two) things, namely the function of the plant and the requirements for its placement. It is recommended that local plant species be selected, favored by birds, and have a low evapotranspiration rate.

e. RTH Pedestrian Space

Pedestrian space is the space provided for pedestrians on either side of the road or in the park. Pedestrian spaces equipped with green open space must meet the following:

1) Comfort, is a way of measuring the functional quality offered by the pedestrian system, namely:

   Orientation, in the form of visual signs (landmarks, road markings) on the landscape to assist in finding roads in the larger environmental context;

   Ease of moving from one direction to another which is influenced by pedestrian density, the presence of physical barriers, road surface conditions and climatic conditions. Pedestrian paths must be accessible to everyone including people with disabilities.
2) Physical character, including:

   Dimensional criteria, adapted to local social and cultural conditions, habits and lifestyles, population density, heritage and values held to the environment;

   The criteria for movement, the average distance people walk in each place are generally different, influenced by the purpose of the trip, weather conditions, habits and culture of the community.
3) More detailed technical guidelines for pedestrian paths can refer to the Minister of Public Works Decree No. 468/KPTS/1998 dated December 1, 1998, concerning Technical Requirements for Accessibility in Public Buildings and the Environment and Guidelines for Provision and Utilization of Infrastructure and Facilities for Pedestrians. In general people do not want to walk more than 400 m.

In addition to Green Open Space,

according to the mandate of Law no. 26 of 2007 concerning Spatial Planning in article 31, that non-green open space is also needed. What is meant by Non-Green Open Space (RTNH) is an open space in a city/urban area that is not included in the RTH category, namely in the form of hardened land or in the form of water bodies or certain surface conditions that cannot be overgrown with plants or are porous.

The importance of providing and utilizing the RTNH in the Arosuka Planning Area is as a place for various activities to take place. With a supporting function as a forum for economic activities and ecological conservation as well as a complementary function as an environmental aesthetic. In the context of the environment, its provision and utilization is directed towards having an ecological function to assist the function of green open space in conserving ground water through the completeness of its utilities such as drainage and infiltration.

In the Arosuka Planning Area, a city that still has inadequate RTNH facilities such as a parking area provided by the government. Currently, parking facilities are available only by utilizing the GSB for shop houses or shops that are available on several roads in the center of the planning area and most of the existing vehicles use parts of the body of the road as a vehicle stop. This condition is certainly very disturbing traffic order, especially in the center of the market because it can trigger congestion. So it is necessary to build RTNH on sections that are considered to have the most crowded level of vehicle mobilization, such as the primary arterial road, Jalan Solok - Padang City in the Arosuka area (the metropolitan support area of Padang City).

CONCLUSIONS

The Arosuka area has been designated as (Capital of Solok Regency). The management and arrangement of this area is strived to become an environmentally friendly green city. However, there is one uniqueness where the green city theme is usually more related to city parks, drainage, waste management and so on, but the Arosuka area is located in the Indragiri Rokan Catchment Area. Regional leaders together with related parties have prepared regional planning with the vision of a green city in the Catchment Area by preparing 5 strategies. Further research is needed to determine the implementation of the prepared strategy.

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