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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : *PROSIDING*

Judul karya ilmiah (paper) : Spatial Distribution of Socioeconomic Characteristics in Rural's Java: A Case From Three Different Rural Areas in Central Java
Jumlah Penulis : 4 orang
Status Pengusul : I Rudiarto, **W Handayani**, H B Wijaya, T D Insani

Identitas prosiding :
a. Judul Prosiding : IOP Conference Series:Earth and Environmental Science
b. ISBN/ISSN : 1755-1315
c. Tahun Terbit/tempat pelaksanaan : 2018
d. Penerbit/organiser : IOP Publishing
e. Alamat repository PT/web : http://iopscience.iop.org/article/10.1088/1755-1315/123/1/012024
f. Terindeks di (jika ada) : SJR 0,175 (2019) dan SNIP 0,514 (2019)

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Total = (100%)		**10**	**7,5**
Nilai = (40% x 7,5 : 3)			**1**

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a. Unsur isi paper lengkap dan mengacu kepada petunjuk penulisan yang tersedia *online*. Judul dan IMRaD terkait satu dengan yang lain tepatnya pada pembahasan distribusi spasial karakteristik social ekonomi petani.

b. Pembahasan cukup mendalam mengenai distribusi spasial petani secara social ekonomi yang dilihat dari tingkat pendapatan, pendidikan, dan produksi hasil pertanian. Isi tulisan sesuai dengan bidang ilmu penulis dalam bidang perencanaan dan pengembangan pedesaan. Pembahasan hasil tidak didukung oleh sumber pustaka.

c. Paper seminar didukung 13 pustaka dimana 7 diantaranya merupakan terbitan 10 tahun terakhir dan hanya 6 yang berupa artikel jurnal. Data dan metode cukup mutakhir dengan menggunakan teknik analisis interpolasi dalam GIS.

d. Prosiding terindeks *Scopus* (IOP Series) dengan SJR 0,175 tersedia *online* dan *open access*. Prosiding dilengkapi dengan ISBN, DOI, dan terkategori prosiding internasional.

Semarang, 12-04-2020
Reviewer 1,

Prof. Dr.rer.nat. Imam Buchori, ST
NIP. 197011231995121001
Departemen PWK, FT. Undip

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b. Ruang lingkup dan kedalaman pembahasan (30%)		3	2
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)		3	2
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)		3	3
Total = (100%)		**10**	**8**
Nilai = (40% x 8 : 3)			**1,1**

Catatan Penilaian paper oleh *Reviewer*:

a. Isi tulisan lengkap dan sesuai dengan *author guidelines* prosiding. Judul dan IMRaD berkaitan dengan pembahasan spasial karakteristik social ekonomi yang dibahas secara spasial dari distribusi yang didapat.

b. Substansi artikel sesuai dengan ruang lingkup seminar dan juga dengan bidang penulis dala konteks perencanaan pengembangan pedesaan. Tidak terdapat referensi yang digunakan dalam membahas hasil.

c. Artikel miliki nilai kebaruan cukup dengan total referensi sebanyak 13 dengan 54% diantaranya merupakan terbitan ≤ 10 tahun terakhir. Metode terlalu singkat dan kurang dibahas secara mendalam tentang interpolasi.

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Semarang, 09-07-2020
Reviewer 2,

Prof. Dr. Ir. Nany Yuliastuti, MSP
NIP. 195407171982032001
Departemen PWK, FT. Undip

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
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Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
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a.Kelengkapan unsur isi paper (10%)	1	1	1
b.Ruang lingkup dan kedalaman pembahasan (30%)	2	2	2
c.Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	2	2	2
d.Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	2,5	3	2,75
Total = (100%)	**7,5**	**8**	**7,75**
Nilai = (40% x 7,75 : 3)			**1**

Semarang, 17-07-2020

Reviewer 1,

Prof. Dr.rer.nat. Imam Buchori, ST
NIP. 197011231995121001
Departemen PWK FT.Undip

Reviewer 2,

Prof. Dr. Ir. Nany Yuliastuti, MSP
NIP. 195407171982032001
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IOP Conference Series: Earth and Environmental Science
Volume 123, Issue 1, 22 February 2018, Article number 012024
2nd Geoplanning - International Conference on Geomatics and Planning; Surakarta - Central Java; Indonesia; 9 August 2017 through 10 August 2017; Code 134955

Spatial Distribution of Socioeconomic Characteristics in Rural's Java: A Case from Three Different Rural Areas in Central Java (Conference Paper) (Open Access)

Rudiarto, I. ✉, Handayani, W. , Wijaya, H.B., Insani, T.D.

Department of Urban and Regional Planning, Diponegoro University, Semarang, Indonesia

Abstract

The intention of this paper is to combine the socio economic development into spatial aspect with the fact that the divided sub study areas are differed in its socio-economic characteristic. The research was conducted in three different rural areas, i.e.; coastal area in Sayung sub district - Demak Regency, plain area in Delanggu sub district - Klaten Regency, and mountain area in Kledung sub district - Temanggung regency. Spatial interpolation technique has been applied in order to identify the spatial distribution of socioeconomic data. The results show that socioeconomic characteristic in plain area and coastal area is more varied and regularly distributed as compared to the mountain area. Educated people are less found in the plain area while in coastal and mountain area the condition is better. Coastal area is identified as the prone area to the disaster issues and therefore socioeconomically vulnerable. The result of this research is very important to the development policies that need to undertake regarding to socioeconomic development in each associated location. © Published under licence by IOP Publishing Ltd.

SciVal Topic Prominence

Topic: Rural Settlements | Land Consolidation | Spatial Agglomeration

Prominence percentile: 96.478

Author keywords

Central Java | Household | Rural Area | Socioeconomic | Spatial Interpolation

Indexed keywords

Engineering controlled terms: Coastal zones | Economic and social effects | Economics | Interpolation | Landforms | Spatial distribution | Surveying

Engineering uncontrolled terms: Central Java | Development policies | Household | Socio-economic data | Socio-economic development | Socioeconomic | Socioeconomic characteristics | Spatial interpolation

Source details

IOP Conference Series: Earth and Environmental Science

Scopus coverage years: from 2010 to Present

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2nd Geoplanning-International Conference on Geomatics and Planning

PREFACE

The 2nd Geoplanning - International Conference was held on 9-10th September, 2017 in Solo, Central Java, Indonesia. Geoplanning is an international conference covering research and development in the field of applied geomatic's technologies for spatial planning, including GIS, Remote Sensing, and Satellite Image Processing. More than 132 abstract were submitted and after an initial review 80 papers were presented. Through peer review process, 50 papers were accepted for publication in the Geoplanning Conference Proceeding.

The present volume is highlighting major issue of Sustainable Development with focusing topic on "Geomatic's Application for Disaster Management and Spatial Planning." Furthermore, the topic was divided into four themes;

Theme 1: Disaster Modelling & Management

Theme 2: Infrastructure and Settlement

Theme 3: RS-GIS for Spatial Modelling

Theme 4: Urban and Regional Planning

We would like to thank all the reviewers for their time and effort in reviewing the documents. The published papers have passed the process of improvement accommodating the discussion during the conference as well as the reviewers' comments who have guided any necessary improvement. Finally, we would like to thanks to all of the proceeding team who have dedicated their constant support and countless time to bring these scratches into a book.

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Sensitive Land Use Planning, Malinao, Albay, Philippines

A M R Abante[1] and C G R Abante[1]

[1]Bicol University, Philippines

email: anamarie.abante@bicol-u.edu.ph

Abstract. This paper reviews the hazard zone as defined in the zoning ordinance of the Local Government of Malinao. The zonification was completed in accordance with the approved Comprehensive Land Use Plan stipulating the allowed use and regulations of zones to control future land development. This paper brings together an examination of human exposure as well as spatial situations and conditions of their houses within the hazard zone playing with flood risks. *The* purposive selection sample households were based on characteristics of people residing within it, in which the site concurs with the flood forecasted frequent every 5, 25 and 100 years turned to be significant to better understanding 'risks computing' were variables retrieved from the intersecting spaces fused to get the complex interrelationship of the sets of flood hazard, vulnerability and exposure of inhabitants and their place of residence weighted against capability of individual family or household to withstand effects of flooding. The Risk Quotient Object and Field Bases Model were tested in specific location in Malinao. The sample households' individual risk location quotient varies from high to a very high risk distributions ranging from 8 to 125 numerical values. As Malinao stays on to experience flood hazards, changing climate and other natural calamities, the need to understand the six elements of disaster risk computing at household level is becoming crucial in risk reduction meeting the targets and priorities for action as specified in the Sendai Framework.

Keywords: Zoning, Exposure, Risk Computing, Risk Quotient, Household

1. Introduction

The prevailing principle of the Habitat I which was held in Vancouver in 1976 provides importance to water for life and adopt programs for the sanitary disposal of waste water. Similarly the prevailing principles of the Habitat II which was held in Istambul in 1996 arrest the deterioration of global human settlements conditions and ultimately creates the conditions for achieving improvements in the living environment of all the people on sustainable basis. In October 2016, the Habitat III held in Quito, the prevailing principles focus on Housing [1] and Sustainable Urban Development to adopt a New Urban Agenda. This work is seen significant in regulating the use of the land and activities in hazard zones particularly those families within the immediate vicinity of rivers and other waterbodies as well as providing guidance to the residents at risk and decision making in land management, land use planning and monitoring local developments [2,3].

IOP Conf. Series: Earth and Environmental Science **123** (2018) 012019 doi:10.1088/1755-1315/123/1/012019

Modeling the Dynamic Interrelations between Mobility, Utility, and Land Asking Price

E Hidayat[1], **I Rudiarto**[2], **F Siegert**[3], **and W D Vries**[3]

[1]Institute of Road Engineering, Indonesia
[2]Department of Urban and Regional Planning-Diponegoro University, Indonesia
[3]Technische Universitat Munchen, Germany

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Abstract. Limited and insufficient information about the dynamic interrelation among mobility, utility, and land price is the main reason to conduct this research. Several studies, with several approaches, and several variables have been conducted so far in order to model the land price. However, most of these models appear to generate primarily static land prices. Thus, a research is required to compare, design, and validate different models which calculate and/or compare the inter-relational changes of mobility, utility, and land price. The applied method is a combination of analysis of literature review, expert interview, and statistical analysis. The result is newly improved mathematical model which have been validated and is suitable for the case study location. This improved model consists of 12 appropriate variables. This model can be implemented in the Salatiga city as the case study location in order to arrange better land use planning to mitigate the uncontrolled urban growth.

Keywords: Modeling, Land asking price, Urban growth, Salatiga City

1. Introduction

Regarding the future interest, planning a city should consider sustainable development. The challenge is to linking economic activities, social issues, and environmental impacts. One way to achieve sustainable development is by using land use planning to control economic and social activities, so as a result, allocation of land should fit particular uses. Land use is very important as a benchmark for parceling mechanisms, also as a benchmark for zoning the urban environments. Zoning has a function to evaluate the environmental consequences, as well as to support the future decision making in order to mitigate the negative effects of urban development [1].

Urban development is influenced by population growth and rapid urbanization process. These cause urban sprawl which leads to unsustainable practices that cause ecological, social and environmental problems [2]. Furthermore, population growth triggers a rapid land use change particularly converting farmland into housing areas. The increase of population is equal to the increasing demand for housing. While, a high density of housing areas evokes new issues, like the probability of hazards, such as fire hazards, an increasing need of water, and the high impacts of houses on ecosystem function [3]. Moreover, high population density and the establishment of new settlements may entail serious problems in water supply, energy provision, and utilities [4]. Similar findings by Mohammady [5] show that the expansion of urban areas results in a lack of infrastructure, increase of environmental pollution, and limits urban services. Eventually, unplanned urban growth

Spatial Distribution of Socioeconomic Characteristics in Rural's Java: A Case from Three Different Rural Areas in Central Java

by Wiwandari Handayani

Submission date: 19-Mar-2020 03:45PM (UTC+0700)
Submission ID: 1274043054
File name: Java_A_Case_from_Three_Different_Rural_Areas_in_Central_Java.pdf (405.2K)
Word count: 4244
Character count: 22481

Spatial Distribution of Socioeconomic Characteristics in Rural's Java: A Case from Three Different Rural Areas in Central Java

Spatial Distribution of Socioeconomic Characteristics in Rural's Java: A Case from Three Different Rural Areas in Central Java

I Rudiarto [1], W Handayani [1], H B Wijaya [1], and T D Insani [1]

[1] Department of Urban and Regional Planning, Diponegoro University, Semarang, Indonesia

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Abstract. The intention of this paper is to combine the socio economic development into spatial aspect with the fact that the divided sub study areas are differed in its socio-economic characteristic. The research was conducted in three different rural areas, i.e.; coastal area in Sayung sub district – Demak Regency, plain area in Delanggu sub district – Klaten Regency, and mountain area in Kledung sub district – Temanggung regency. Spatial interpolation technique has been applied in order to identify the spatial distribution of socioeconomic data. The results show that socioeconomic characteristic in plain area and coastal area is more varied and regularly distributed as compared to the mountain area. Educated people are less found in the plain area while in coastal and mountain area the condition is better. Coastal area is identified as the prone area to the disaster issues and therefore socioeconomically vulnerable. The result of this research is very important to the development policies that need to undertake regarding to socioeconomic development in each associated location.

Keywords: Socioeconomic, Spatial Interpolation, Household, Rural Area, Central Java

1. Introduction

Socioeconomic characteristics in a rural area is very much related to the resource use owned by the farming families as well as the location where the family lives [1–4]. In the socioeconomic development, the location of the rural's family is indicated by the settlement distribution in a specific place. Generally, rural settlements are in high pressure of the urbanization and have been significantly transformed into a more urbanized area [5]. The existence of settlements in rural area is a central unit as it may reveal the relationships between land and the people, the historical background of a community, as well as the socio-political connections [6,7]. Therefore, the settlement distribution in rural area will also show the socioeconomic conditions of the people. On the other hand, resource use in the rural area indicates the relationship between economic and environmental aspect. Income gain by the farming family represents the economic aspect while land resource utilisation represents the environmental aspect. Farming families are the main player between those two aspects where the decision on how to utilise the resource very much depends on the family [8].

Rural area is mostly dominated by the agricultural land where income of rural people is majorly generated from this sector. Usually, the location of agricultural land owned by the farming family is located nearby the settlement area where the family lives. Even, most of the houses of farm families is located within their farm field which made the land maintenance is much easier. Therefore, the assessment of socioeconomic characteristics of rural area becomes more attractive since it may reveal the capability of rural people in maintaining their land resource which implicates to the family income. In addition, rural areas have a great diversification in terms of physical environment, ecology, and pattern of land use as well as their socioeconomic characteristics [9]. Due to their great diversification, each socioeconomic characteristics of rural area has it owns specification either in coastal, plain, or mountain area where spatial concern is the major aspect. Knowing the socioeconomic characteristics of each typical rural area would certainly useful in understanding the socioeconomic development and what type of characteristic is found more in one region as compared to others.

To understand the socioeconomic development, a set of socioeconomic characteristics data need to be elaborated, tabularly and spatially. The assessment of spatial distribution of socioeconomic characteristics in typical rural area by using Geographical Information System (GIS) and Remote Sensing (RS) has become widely concerned to describe more clear understanding on the specific issue [10–12]. The concept of spatial distribution is derived from the interaction of resource use and farming activities indicated by the location of each farming family. Spatial description on socioeconomic characteristic therefore is able to define the situation more clearly instead of a table format which the researchers normally did. Tables succeed in organizing information for easy comparison and for analysis in spreadsheets or statistical packages, but they do so by largely ignoring one particular property of each object: its geographic location [13]. By distributing and analyzing table data into its geographical location, a better understanding on how the data correlated can be spatially presented. This paper is amed to describe the socioeconomic characteristis of farming family by assesing the socioeconomic development of three different rural areas in Central Java.

2. Data and Methods

2.1 Study Area

Three different rural areas were selected as the study area, i.e.; rual coastal area, rural plain area, and rural mountain area. The reason of selecting those rural areas is to compare and to show how the socioeconomic characteristices distributed in each rural area. Those three rural areas are Sayung sub district in Demak Regency for coastal rural area, Delanggu sub district in Klaten Regency for plain rural area, and Kledung sub district in Temanggung Regency for mountain rural area. Concerning the elevation level, the study areas located on the different altitudes level following a gradient line from coastal to mountain area. Sayung sub district is located on 0 - 3 meters above sea level (asl); Delanggu from 100 up to 200 meters asl, and Kledung varied from 1138 m up to 1500 m (asl). The location of study area are shown in Figure 1.

2.2 Data Needs

To provide basic data on socio economic characteritics, randomly selected farm family was applied in study areas by handing out standardized questionnaires to 83 farm families (see Figure 2) distributed in study area. Those 83 farm families were distributed more less equal in three study areas; 23 samples in Sayung subdistrict, 30 samples in Delanggu subdistrict, dan 30 samples in Kledung subdistrict. Specifically in Sayung subdistrict, less samples number were applied due to less farm families found in that area. Selection of farm family surveyed is based on their geographical location where the even

distribution is preferable. Socioeconomic data that are being captured were related to farm income, off farm income, family income, education level, and farm yield in 2017.

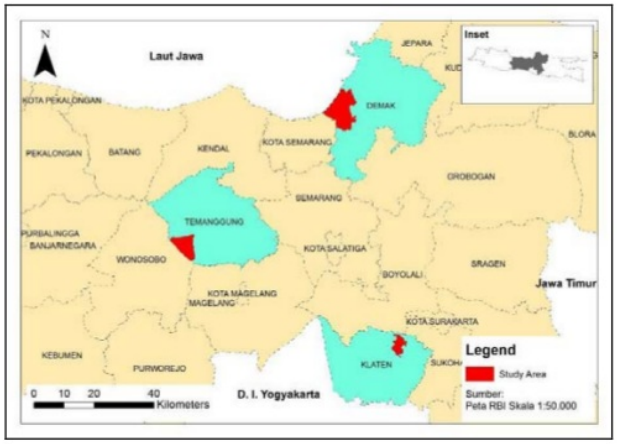

Figure 1. Study Area

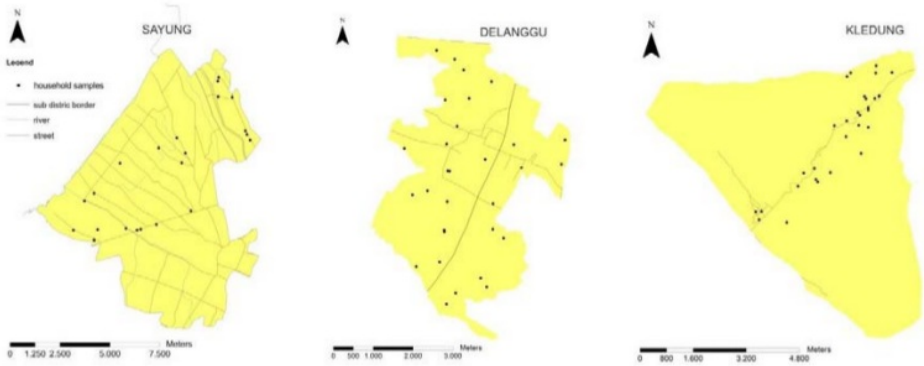

Figure 2. Samples Distribution in Study Areas

2.3 Method

A spatial calculations were carried out with interpolation technique to generate data for the whole study areas. Prior to the interpolation technique, each location of surveyed families was recorded using the Global Position System (GPS) to locate them into their geographical location. This step is very important to be performed as the location of each sampling family will be the link between socio economic data and its spatial aspect. By linking all related data and information to its spatial location, spatial analysis in GIS can be carried out.

The interpolation technicque was done from point data collected throuh the micro level survey. Spatial interpolation is the procedure of estimating the value of a field variable at un-sampled sites within the area covered by sample locations or in simple words, given a number of whose locations and values are known. Kriging method was applied as the interpolation technique to generate socioeconomic data for each stuy area. Krigging method involves several steps in its process and more appropriate used if the user has already known the spatially correlated distance or directional bias in the data [4].

Interpolating socioeconomic data from sampled points is intented to identify all the unknown value of unsampled area within the study area where specific socioeconomic data can be generated to the whole study area. However, the interpolation results may over or underestimate the conditions at the edge of surface. The interpolation, particularly at the border of study area and at the less sample point area, is often continued with unrealistic values. Once the last sampling point is passed, the derived trend continues with the same gradient as before the sampling point and makes the values rise or decline inappropriately in some cases. To avoid these possible errors, the interpolated grid layers were classified, thus only the class bandwidth is readable from the maps [3].

3. Results and Discussion

3.1 Farm İncome Distribution

Farm income shows the economic ability of a farm in a year to provide an economic surplus to the farming family. Farm income in Sayung sub district is dominated by fish farming activity that is commonly found in coastal rural area. Delanggu sub district as a plain rural area is one of the main rice producer in Central Java and it dominates its household farming activity. On the other hand, Kledung sub district as a mountain rural area shows a dominant farming activity for tobacco and vegetables. Table 1 below shows the amount of average farm income from each study area. The highest average farm income comes from Kledung sub district with Rp 164.213.000,- for each household, followed by Sayung sub district with Rp 36.388.000,- and the lowest is Delanggu sub district with Rp 11.404.000,-. These outcomes can give the raw insight on the value of the product from each area type.

Table 1. Average Farm Income

Sub District	Area Type	Avg. Farm Income (in 1000 rupiah)
Sayung	Coastal Rural	36.388
Delanggu	Plain Rural	11.404
Kledung	Mountain Rural	164.213

Spatial calculation was applied to describe further differentiation of farm income between area types. Through interpolation technique that has been explained before based on information from household interview, Figure 3 shows the distribution of farm income of each study type. The darker colour portray the higher income. Kledung sub district is dominated by the darker green while Delanggu sub district has its darker green mainly in the central area. Although Sayung sub district has higher average farm income than Delanggu, the distribution of its farm income is generally on the lower side as shown in the lighter green colour that dominate it. However, the spatial differentiation in study areas is only to show the distribution of farm income among the interviewed household but not to take into account as the representative for the whole area. The more samples will influence the spatial distribution and accordingly change the spatial differentiation as well.

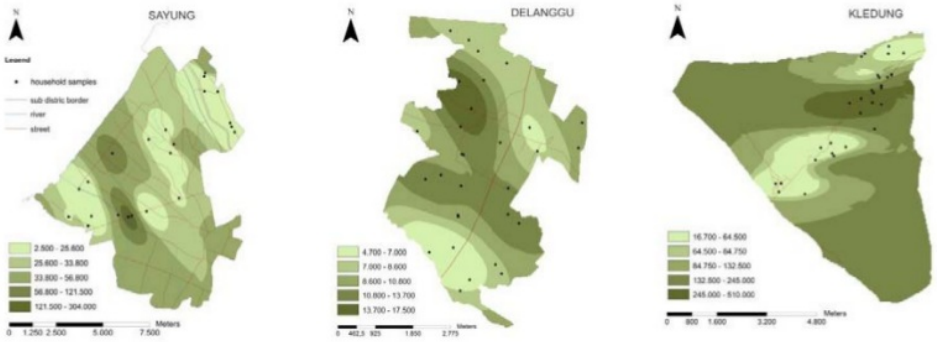

Figure 3. Farm Income Distribution (in 1000 Rupiahs) in Study Areas

3.2 Off-Farm İncome Distribution

Off-farm income derived from off-farm activities per year that take place outside the family's own responsibility of farm business. As farming becomes the main activity for almost all the household in study area, the existence off-farm income for some households is not as vital as farm income in supporting family livelihood. The involvement of family members in off-farm activities can be classified into two categories in general: permanent and seasonal jobs. Permanent job of the interviewed households are government official, private employer, and trader. Seasonal job is related to all types of jobs that family members irregularly involved such as field worker, building worker, and driver.

Table 2. Average Off-Farm Income

Sub District	Area Type	Avg. Off-Farm Income (in 1000 rupiah)	Household with Off-Farm Activities
Sayung	Coastal Rural	17.346	7
Delanggu	Plain Rural	17.928	13
Kledung	Mountain Rural	7.613	15

In the study area, there are 42% households from total interviewed households who are engaged in off-farm activities. Kledung sub district has a highest total of 15 households or 50% of composition followed by Delanggu sub district with 13 households or 43% and the last is Sayung sub district with 7 households or equal to around 30%. Eventhough there is not always a household member that engage in off-farm activities, for the households who do, a member who engage in off-farm activity can has more than one off-farm jobs.

As shown in Table 2, the highest off-farm income is Delanggu sub district with the average of Rp 17.928.000,- followed closely by Sayung sub district with Rp 17.346.000,- and Kledung sub district with Rp 7.613.000,-. Spatial distribution of off-farm income (Figure 4) shows clearly the spatial differentiation of off-farm income from high level to the low level income. It can be inferred as well that the amount level of family who gained off-farm income had been increased from coastal rural area which is Sayung

sub district to mountain rural area type which is Kledung sub district. More households are engaged in off-farm activities the higher the area.

Figure 4. Off-Farm Income Distribution (in 1000 rupiahs) in Study Areas

3.3 Family İncome Distribution

Family income is the main criteria in economic ability of family to support family needs and expenses. Family income is generated in one year by integrating farm and off-farm incomes. Usually, family income of the rural area households are largely contributed by farm income, but among the three study areas, Delanggu sub district shows different condition where off-farm income makes up 61% of the average family income while farm income only contributes 39%. Although in average the contribution of off-farm income is higher to the family income in this sub district, there might be some households that their farm incomes make up their family income more. For Sayung sub district, average family income is made up by farm income at 68% while for Kledung, the average family income dominantly comes from farm income at 96%.

Table 3. Average Family Income

Sub District	Area Type	Avg. Family Income (in 1000 rupiah)	Compotition	
			Farm income	Off-farm income
Sayung	Coastal Rural	53.735	68%	32%
Delanggu	Plain Rural	29.332	39%	61%
Kledung	Mountain Rural	171.826	96%	4%

Table 3 shows that the average family income in all three study areas is alined with the amount of average farm income. Kledung sub district has the highest average family income with Rp 171.826.000,- followed by Sayung, that barely has a third of Kledung's, with Rp 53.735.000,- and Delanggu sub district with Rp 29.332.000,-. Spatial analysis using interpolation is also used to see the distribution of family income in three study area (Figure 5). The darker orange colour covers most of high family income level in study area. Lighter orange colour shows low family income level that is distributed more in Sayung sub district and some part of Delanggu subdistrict. The interval of family incomes in each study area can also

indicate the income gap of the households. From the picture we can see that although Delanggu sub district has the lowest family income, the income gap is nogt as severe as Sayung sub district and Kledung sub district.

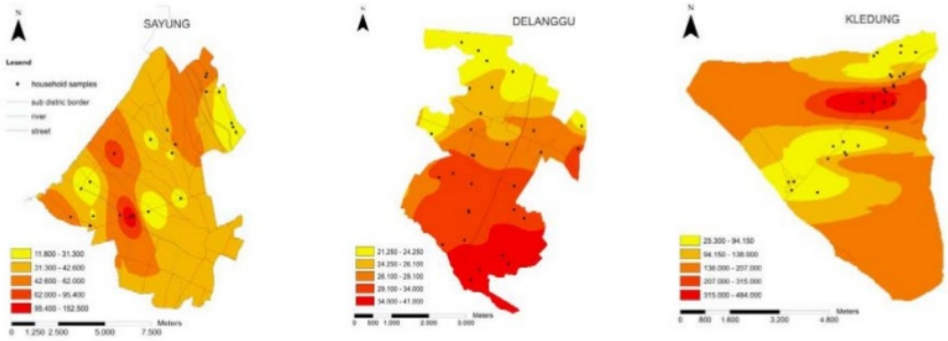

Figure 5. Family Income Distribution (in 1000 rupiahs) in Study Areas

3.4 Education Level

Educational background of family members determines family's perception in society and how they make decission surrounding their lives. The higher education level the wider knowledge and information can be gained which is very useful in managing and developing the ability of various family resources. In general, analysis from interview data shows that level of education in study area is noticeably medium where only a little number of people found illiterate as shown in table 4.

Table 4. Education Level

Sub District	Area Type	Education Level			Weighted Education Index
		Illiterate	Elementary - High School	Higher Education	
Sayung	Coastal Rural	2	60	16	0,82
Delanggu	Plain Rural	1	83	13	0,77
Kledung	Mountain Rural	2	102	5	0,82

Weighted education index shows that there are more higher-educated people in Sayung sub district (coastal rural area) and Kledung sub district (mountain rural area) with average index of 0.82 compared to Delanggu sub district which has average index of 0.77. However, from the number of total people from each education level, Sayung sub district and Delanggu sub district have more people with higher education level than Kledung sub district. It can explains that the level of high education following altitudinal gradient and increasingly from higher altitude area to lower altitude area.

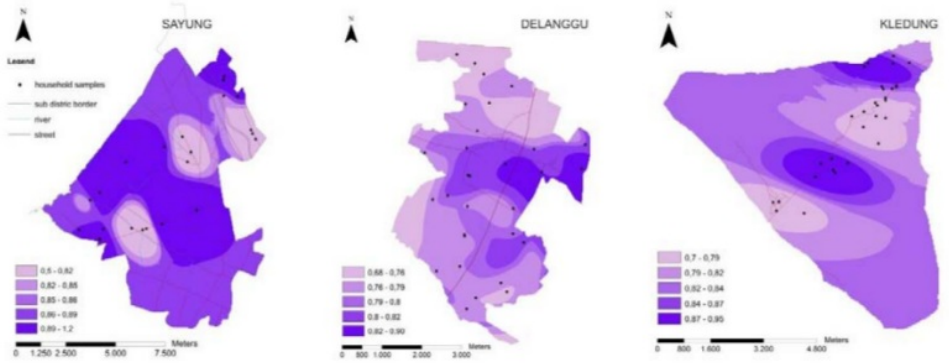

Figure 6. Weighted Education Index

Spatial distribution of weighted education index was built by using interpolation technique that allows measurement of surrounded data where there is no data available. As shown in Figure 6, the distribution of educated people is expressed by violet colour where the darker the colour indicate a higher index. Sayung sub district overall shows indication that higher-eductaed people are spread mostly in its central area and they have higher index than the other two study area. Delanggu sub district shows more lighter colour which mean that it has less higher-educated people. Lastly, Kledung sub district shows that it is placed in the middle level with more area covers by moderate amount of darker colour yet less with lighter colour. This empirical result may arise due to the possibilities of different level of educational facilities and infrastructures that exist.

3.5 Farm Yield

Farm yield shows the amount of a commodity that was harvested per unit of land which in this reasearch is measured in kilograms per hectare (kg/ha). It shows the productivity of farm activity. The size of land is not the main factor that can make a higher level of productivity. The opposite condition of the corelation between land size and land productivity is shown in Table 5. The area with biggest number of leverage and size has the lowest number of farm production.

Table 5. Average Farm Yield

Sub District	Area Type	Avg. Land Size (ha)	Avg. Farm Yield (kg/ha)
Sayung	Coastal Rural	2,21	3.233
Delanggu	Plain Rural	0,54	11.214
Kledung	Mountain Rural	1,15	9.832

Sayung sub district has the highest average land size of 2,21 ha but it can only produce fish product as much as 3.233 kg/ha. Kledung sub district has average land size of 1,15 ha with farm yield of 9.832 kg/ha while Delanggu sub district with only average land size of 0,54 ha can produce 11.214 kg/ha of rice. This opposite condition between the land size and farm yield can also be caused by the difference land size it is needed to produce each kind of commodity. The spatial distribution of farm yield is as shown in Figure 6

where darkest red colour dominates central area of Delanggu sub district while the same dark colour only appears in the smallest part of both Sayung sub district and Kledung sub district. But at the same time, Delanggu sub disrict also has the most area covered in lighter red colour than the other study areas which indicate that a lot of its area has a tendency of producing smaller amount of product.

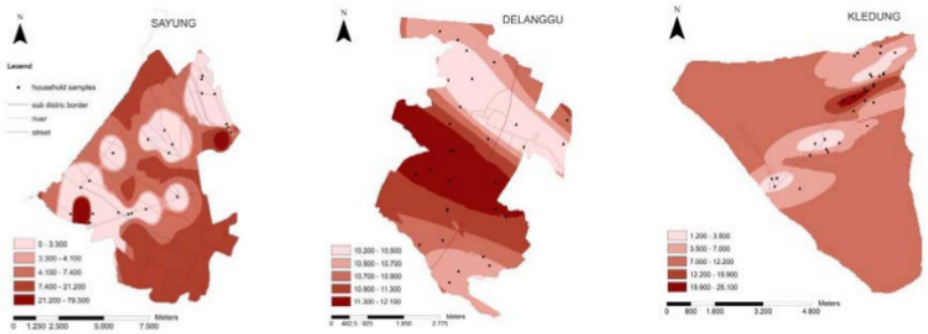

Figure 7. Farm Yield Distribution (kg/ha) in Study Area

4. Conclusions

Spatial assessment of socioeconomic characteristics in three study areas had shown how the socioeconomic development were distributed and what kind of characteristics found more dominant as well as which rural area has a better condition as compared to other rural area. In general, the spatial pattern of socioeconomic distribution was found more regular with more less equal distributed in coastal area - Sayung sub district and in plain area - Delanggu sub district as well. While in mountain area - Kledung sub district the spatial pattern was quite irregular where most of the socioeconomic characteristics distribution was found centred. This condition occurred due to the location of the household samples mostly located along the main road.

In terms of socioeconomic characteristics, mountain area – Kledung sub district was found more advance in family income where most of the family gain the income from the tobacco farming. It is also shown that the closer the area to the urban area, the higher the family income as indicated in plain area – Delangu sub district. As the expanded urban area of Solo city, Delanggu sub district has more opportunity to have more income from different sources. Surprisingly, the education level of plain area which is close to the urban area of Solo was not linearly related to the education condition where more educated people is usually found in urban area as the access to education facilities is more possible. On the other hand, plain area – Delanggu sub district has more productivity, indicated by the farm yield per hectare as compared to mountain and coastal area. It looks like the farmer in plain area has more capability in optimizing or even maximizing the input concerning the average land size.

5. Acknowledgement

This paper is part of the research on “Spatial Planning Modelling for Sustainable Rural based on Resources and Biodiversity” funded by Diponegoro University, Indonesia.

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