STUDY OF FERTILITY, MORTALITY, AND MIGRATION IN POPULATION PROJECTION IN NGAWI REGENCY

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Abstract

Ngawi Regency is the westernmost district in East Java province which is directly adjacent to Central Java province. In terms of population in Ngawi Regency, the demographic criteria include size, structure, population distribution, which can change with birth, death, and migration. The absolute population continues to increase, although on the other hand, the growth rate tends to decrease as a result of population policies, either directly or indirectly. The Ngawi Regency area will be able to see its population projection after knowing the fertility, mortality, and migration data which is then overlaid. The purpose of this study is to examine how fertility, mortality, and migration are in population projections in Ngawi Regency.

Keywords: fertility, mortality, migration

1. Introduction

The science of demography in a broad sense is a systematic study of the symptoms and directions of population development within its social framework, so that it has a lot to do with sociology, economics, geography, and other social science disciplines. Population analysis can refer to the community as a whole or certain groups based on certain criteria.
Ngawi Regency is the westernmost district in East Java province which is directly adjacent to Central Java province, has the same system of government as other districts. The government unit that is directly coordinated by the district is the sub-district. Ngawi Regency is divided into 16 sub-districts and 217 villages/kelurahan. Karangjati sub-district is the sub-district with the highest number of villages, namely 17 villages (BPS, 2021).
In terms of population in Ngawi Regency, the demographic criteria include size, structure, population distribution, which can change with birth,

death, and migration. Birth is the main factor that causes population growth. The population growth in Ngawi Regency in 2020 is very large, seen from the number of birth rates (CBR) and GRDP in Ngawi Regency for 431,970 men and 438,087 women. Demographically, Ngawi Regency is experiencing a demographic transition marked by a two-fold increase in the number of working productive ages, and a decrease in the number of elderly people. In addition, the number of migrations in 2020 Ngawi Regency has a low mortality and for migration does not show a large or significant number.

Therefore, the purpose of this study is to discuss how to study fertility, mortality, and migration in population projections in Ngawi Regency.

2. Literature review

A. Demographics

The branch of science that attracts the most attention of economists is the science of population (demography). Economists are interested in this population problem because it is the population who produces and consumes. The number and quality (quantity and quality) of the population of a country are the most important determining elements for the ability to produce and the standard of living (living standard) of a country (Jati, 2015).

Demography (demography) comes from the Greek "demos" which means people or residents and graphein which means drawing or writing. It can be concluded that demography is writing or a description of the population. The science of demography in a broad sense is a systematic study of the symptoms and directions of population development within its social framework, so that it has a lot to do with sociology, economics, geography, and other social science disciplines. Population analysis can refer to society as a whole or certain groups based on certain criteria such as education, citizenship, religion, or certain ethnicity. Based on the description above, it can be concluded that demography is the study of population which includes size, structure,

B. Fertility

Death or mortality is one of the three components of the demographic process that affects the structure of the population, the other two components are births (fertility) and population mobility. Death can be interpreted as an event of permanent loss of all signs of life, which can occur at any time after a live birth. Still birth and miscarriage are not included in the definition of death. Changes in the number of deaths (up and down) in each region are not the same, depending on various factors. The size of this death rate can be an indication or indicator for the level of health and the level of life of the population in an area (Sriningsih, 2011).

The mortality in rural areas of interest is infant mortality. According to (Mariati et al., 2011) the most common cause of infant mortality is the inadequate network of maternal and child health services. This hinders the birth rate in each region. There is a component in the form of migration which is also a factor in the population projection rate. Whether it's in-migration or out-migration, migration will also have an impact on population projections in an area. Other concepts related to the notion of mortality are:

a. *Neo-Christmas death* is death that occurs in infants who are not yet one month old.
b. Still birth or what is often called fetal death is death before the complete expulsion of the baby from the mother at the time of birth regardless of the length of time in the womb.
c. *Post neo-natal* is the death of a child aged between one month and less than one year.
d. Infant death is the death of a child before reaching the age of one year.

C. Mortality

Pratama (2012) migration is the movement of people with the aim of settling from one place to another that transcends political/state boundaries or administrative boundaries or the boundaries of parts of a country. Some of the factors that cause migration are the lack of employment opportunities, dense population in an area, lack of natural resources, the desire to improve living standards, geographical conditions that are not suitable, and due to population distribution.

Migration is one of the important components that helps contribute to the growth of cities and the economic development of cities by involving migrants in formal and informal activities in cities. This situation helps to reactivate the process of rapid urbanization. However, the above discussion also finds that migration is also a contributor to urban poverty because migration contributes to a serious increase in labor surpluses, the failure of the urban sector to provide affordable housing and various other necessary facilities and services (Puspitasari, 2017).

D. Population Projection

The absolute population continues to increase, although on the other hand, the growth rate tends to decrease as a result of population policies, either directly or indirectly. Likewise, population density, especially the rough population density, tends to increase (Ruhimat, 2015).

Population projections relate to population pressures on migration, fertility, and mortality. In this case it is divided into absolute and relative population pressure. Population pressure is absolutely related to the urgent need for food and housing. This type of population pressure can be measured by the

amount of consumption needed by each person, the smaller the number, the greater the pressure. Relative population pressure is defined as the level of deprivation felt by the population when compared to other nations in other countries or with other groups in their own country (Junaidi&Zulfanetti, 2016).

3. Research methods

A. Type of Research

This research uses quantitative descriptive research. Through this type of research, the aim of this research is to determine the rate of fertility, mortality, and migration in the population projection of Ngawi Regency. For the method in this study using an overlay method of quantitative descriptive research. It is called quantitative descriptive because it bases data interpretation on quantitative data with analysis of measurement results. Data interpretation in quantitative descriptive surveys is carried out quantitatively by describing certain forms of relationships and the influence of environmental elements on observed phenomena to prove the measurement results obtained (Wafiah et al, 2020).

B. Research Location

The research location is Ngawi Regency, East Java Province. In this study using image interpretation and data processing in the research area using ArcGIS.

C. Research Subject

In this study perform calculations on:

1. Ngawi District Fertility 2020

2. Ngawi District Mortality 2020

3. Ngawi Regency Migration 2020

D. Research Tools

The tools used in this study consisted of materials for data collection and tools for data processing, described in the following table:

Table 3.1 List of Research Tools

No	Research Tools	Function
I	*Field data collection materials* Ngawi Regency in 2021 Figures (BPS, 2021)	Looking for fertility, migration, and mortality data in Ngawi Regency
II	*Data Processing Tools*	
	Ms. Office 2010	Document processing, analysis of recording data results into graphic data and descriptions of observations.

No	Research Tools	Function
	2. ArcGIS version 10.4	Processing of fertility, mortality, and migration data and to overlay it into a population projection map

E. Data Collection and Analysis Techniques

The first data collection technique used is the analysis technique of the regional journal to be addressed. This process is carried out to analyze fertility, mortality, and migration studies in the study area.

The data analysis technique to be carried out is in accordance with the research objectives, namely the analysis of statistical calculations on fertility, mortality, and migration data. The data analysis was carried out descriptively based on the analysis using by using the component method formula.

$$Pt = P0 + (L - M) + (Mig\ in - Mig\ out)$$

Description

Pt = total population in year t

P0 = total population in base year

L = Number of births

M = Number of deaths

MigIn = Number of inbound migrations

MigOut = Number of outbound migrations

Results and Discussion

Table 4.1 Data on Fertility, Mortality, and Migration of Ngawi Regency in 2020

No.	districts	Fertility	Mortality	Inbound Migration	Migration Out
1.	Sine	365	7	10	5
2.	Ngrambe	354	9	30	15
3.	Jogorogo	357	10	40	18
4.	Kendal	437	14	10	5
5.	Gene	439	14	5	2
6.	Kwadungan	337	15	6	2
7.	Pickaxe	289	18	4	0
8.	Karangjati	690	25	18	8
9.	Bringin	824	25	19	6
10.	The S	560	30	12	5
11.	Ngawi	290	35	80	30
12.	Anvil	232	37	60	20
13.	badass	232	50	50	15
14.	Pitu	242	51	19	11
15.	Widodaren	213	54	22	2
16.	free	333	65	76	16
	Total	**6.194**	**459**	**461**	**160**

BPS (2021)

The table above is data from fertility, mortality, migration (in and out) in Ngawi Regency in 2020. In this study, it is divided into three (fertility, mortality, migration) and will get the final conclusion by overlaying it into the result of the population projection of Ngawi Regency.

The first is regarding fertility (birth), according to Puspitasari (2020) fertility in Ngawi Regency is the result of real reproduction (live born babies) from a woman or a group of women. One of the calculations to determine fertility in general is the crude birth rate, which is the number of live births in an area in a given year per 1000 population in the middle of the year. From the results of data processing obtained a map as follows:
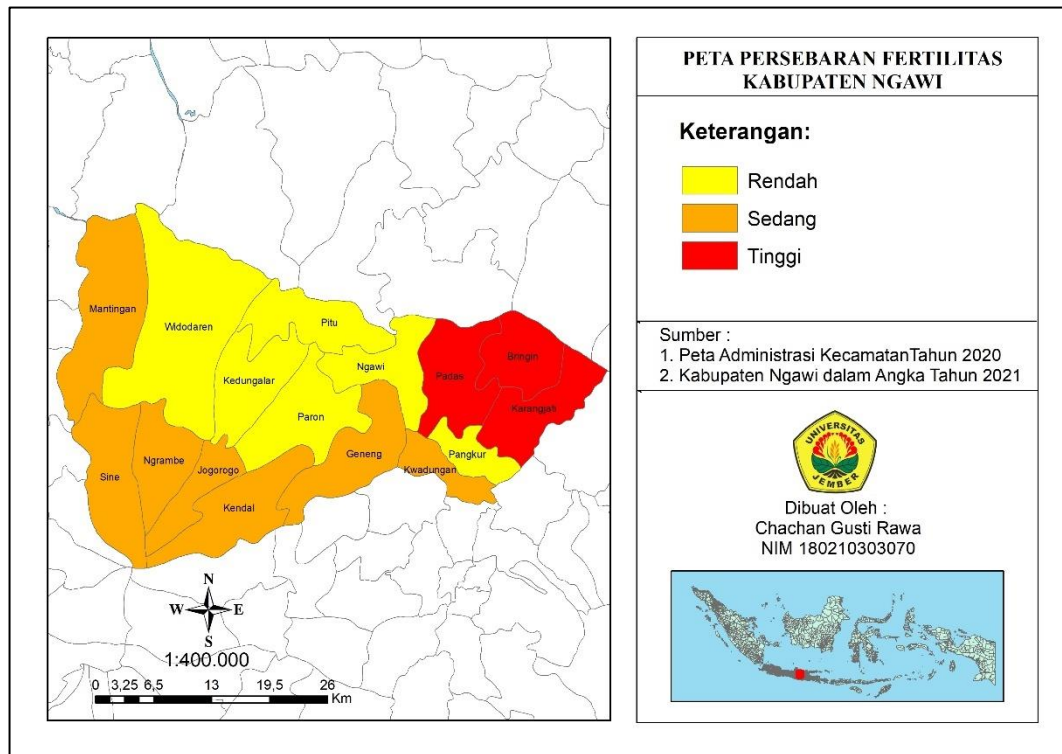

Figure 4.1 Map of Ngawi Regency Fertility Distribution 2020

Results from the map it can be seen that the distribution of fertility has a regional pattern. The area with the highest fertility is in the eastern part of Ngawi which consists of Bringin, Padas, and Karangjati sub-districts. The medium category is found in the western and southern parts of Ngawi and the low category is in the central and northern parts of Ngawi.

The second is mortality (death), in 2020 Ngawi Regency in BPS 2021 data with the results of the calculation in September 2020 (BPS, 2021) of 459. Following data processing results, the map is obtained as follows:
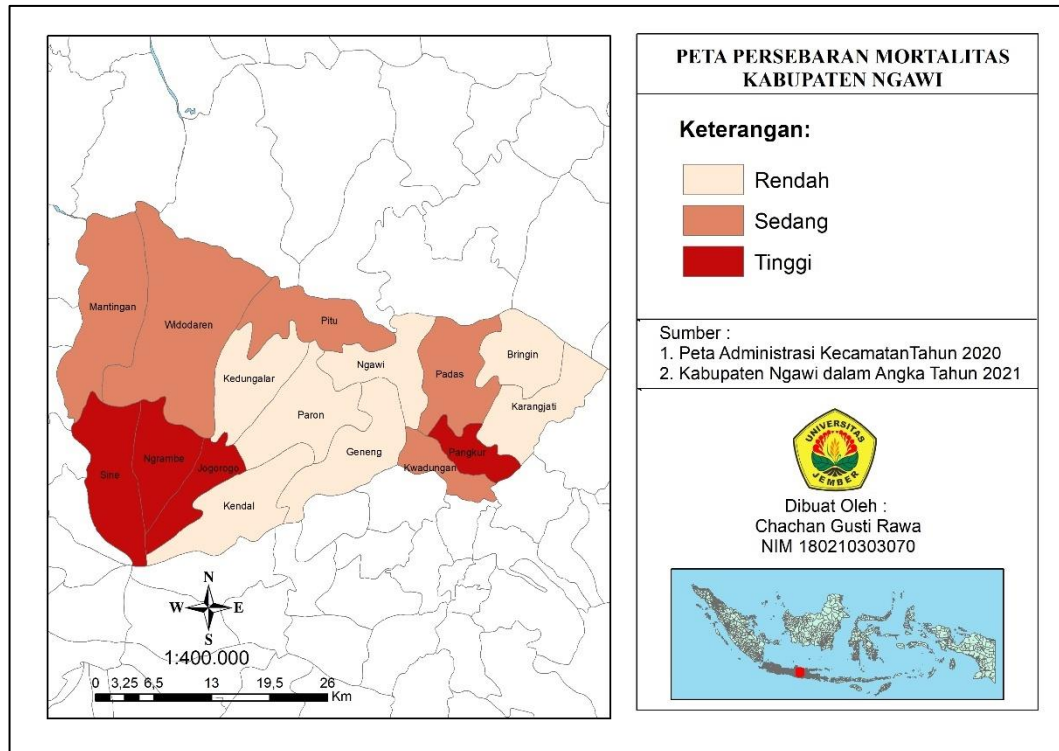
Figure 4.2 Map of the Mortality Distribution of Ngawi Regency 2020

The distribution of mortality in Ngawi Regency was highest in the southern part of Ngawi and Pangkur. The causes of maternal morbidity and mortality in Ngawi are still dominated by cases of pregnancy and childbirth complications. The mother's lack of ability to recognize the danger signs of pregnancy (hyperemesis, vaginal bleeding, swelling of the extremities and face, headaches) is the main source of various complications that can lead to death if the treatment is delayed.

In Ngawi, of the 24 health centers with less K4 coverage, there are 5 health centers. One of them is the Geneng Public Health Center, which is 69.28%. A survey conducted by previous researchers, namely at the Geneng Health Center, of 5 pregnant women who visited, 2 of them had good knowledge, 1 had sufficient knowledge and 2 had less knowledge about the danger signs of pregnancy. and information about the danger signs of pregnancy. On the other hand, there are pregnant women who know but do not visit because they are not economically capable, unwilling, not regularly or have never done antenatal care at all. Whereas antenatal care is very important because the mother will get basic information about maternal health and pregnancy,

The third is migration, in the processing of migration data there are two categories, namely incoming migration and migration. To get net migration, the calculation is carried out: Inbound migration minus Outbound migration, and the following results are obtained:

Table 4.2 Ngawi Regency Migration Data in 2020

No.	districts	Inbound Migration	Migration Out	Net Migration
1.	Sine	10	5	10
2.	Ngrambe	30	15	15
3.	Jogorogo	40	18	22
4.	Kendal	10	5	5
5.	Gene	5	2	3
6.	Kwadungan	6	2	4
7.	Pickaxe	4	0	4
8.	Karangjati	18	8	10
9.	Bringin	19	6	13
10.	The S	12	5	7
11.	Ngawi	80	30	50
12.	Anvil	60	20	40
13.	badass	50	15	35
14.	Pitu	19	11	8
15.	Widodaren	22	2	20
16.	free	76	16	60
	Total	**461**	**160**	**306**

From the results of the data above, here are the results of the migration data processing map in Ngawi Regency in 2020:
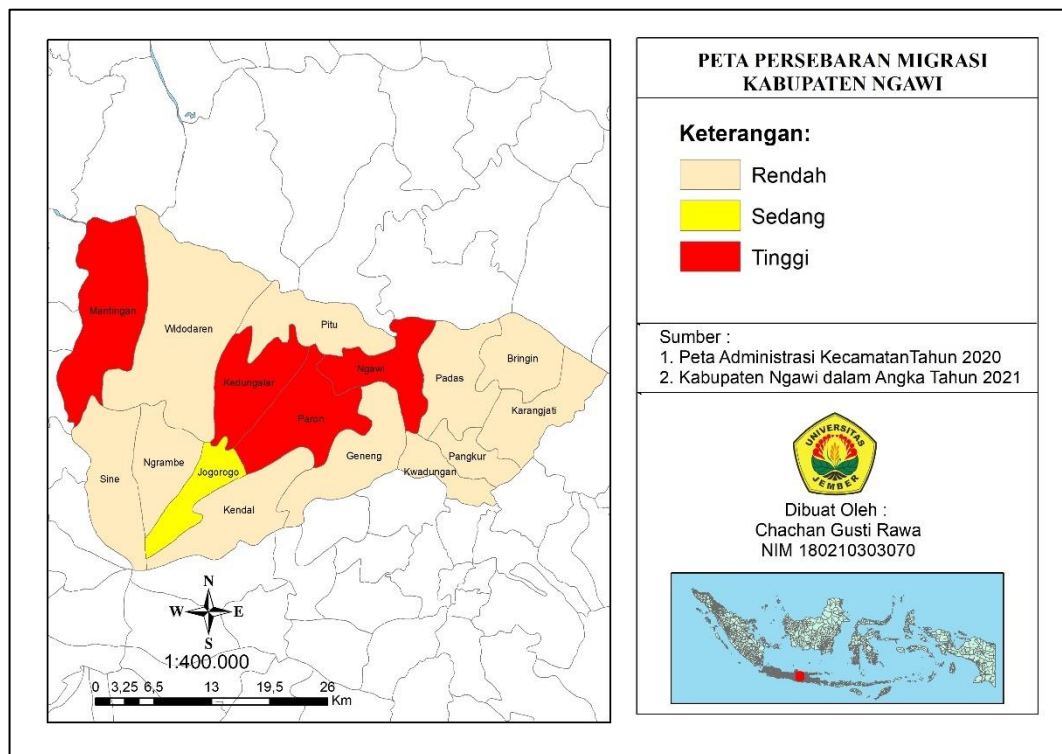

Figure 4.2 Map of the Mortality Distribution of Ngawi Regency 2020

The analysis obtained from the map is that high migration is found in the Ngawi, Kedunggalar, and Paron sub-districts where this area is a large sub-district that exists and has various sectors in Ngawi. Then there is Mantingan in the high

category because its area is directly adjacent to Sragen Regency and is a cross-provincial route.

According to Adam (2018) migration is not an individual issue, but is closely related to family, local community and friendship. When individuals are planning a move, they will make plans so that their parents are cared for, their wives and children are also helped. At the destination, there are already relatives involved in the adaptation process and securing their position in urban areas. When they move to the city, they are assisted by relatives or village friends who are already in the city. They then enter the informal sector as a new strategy in fulfilling their livelihood.

From The results of the three studies above can be overlaid into a population projection map, the following is a map of the results of fertility, mortality, and migration data management:
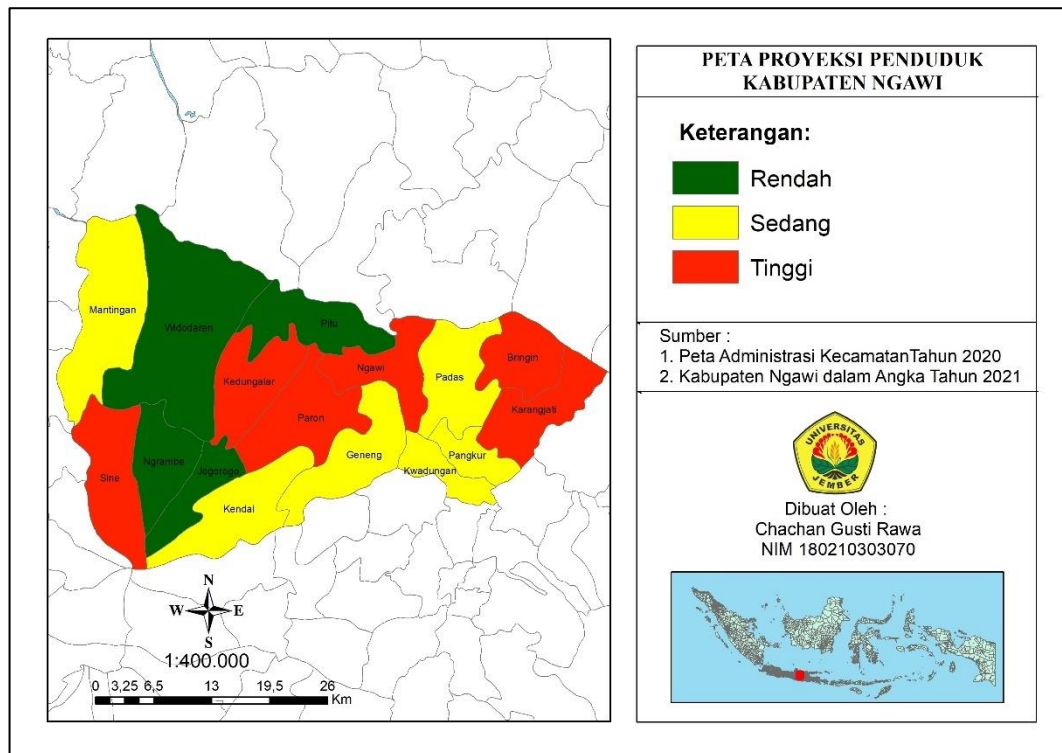

Figure 4.4 Map of Ngawi Regency Population Projection in 2020

Process Development is progressing rapidly, as well as the problem. The absolute population continues to increase, although on the other hand the growth rate is experiencing a downward trend as a result of population policies, both direct and indirect (Ruhimat, 2015).

The projected population of Ngawi Regency is in the high category in the Districts of Ngawi, Paron, Kedunggalar, Sine, Karangjati, Bringin. According to Ichwanudin (2013) this area is a concern in population development, especially the three aspects of fertility, mortality which must be balanced and migration in and out must be controlled. Ngawi as a provincial border area becomes a new

basis that focuses on population aspects that must be controlled. The increasing number of residents in Ngawi Regency is also caused by the program from the central government, namely family planning, which is now held by the regional government. So that there is less socialization of the family planning program to family planning participants in Ngawi Regency. Projectedly, the population of the Ngawi district has a stale area for regional development that can be used as population planning in the Ngrambe and Jogorogo areas which are located at the foot of the mountain and Widodaren and Pitu which are in the drum plains area. With these data results, it can be seen how the population projection of Ngawi Regency is. Population projection data is useful for projecting population data based on birth, death, and migration data. The data can describe which areas have low, medium and high categories in the population projection Population projection data is useful for projecting population data based on birth, death, and migration data. The data can describe which areas have low, medium and high categories in the population projection Population projection data is useful for projecting population data based on birth, death, and migration data. The data can describe which areas have low, medium and high categories in the population projection

4. Conclusion

The population projection of Ngawi Regency in terms of fertility, mortality, and migration. The distribution of fertility in Ngawi has a regional pattern. The area with the highest fertility is in the eastern part of Ngawi which consists of Bringin, Padas, and Karangjati sub-districts. The medium category is found in the western and southern parts of Ngawi and the low category is in the central and northern parts of Ngawi. The distribution of mortality in Ngawi Regency was highest in the southern part of Ngawi and Pangkur. The high category of migration is found in the Ngawi, Kedunggalar, and Paron sub-districts where this area is a large sub-district and has various sectors in Ngawi. Then there is Mantingan in the high category because its area is directly adjacent to Sragen Regency and is a cross-provincial route.

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