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# Countries population determination to test rice crisis indicator at national level using $k$ -means cluster analysis

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**Abstract.** This study aimed to obtain information on the population of the countries which is have similarities with Indonesia based on three characteristics, that is the democratic atmosphere, rice consumption and purchasing power of rice. It is useful as a reference material for research which tested the strength and predictability of the rice crisis indicators Unprecedented Restlessness (UR). The similarities countries with Indonesia were conducted using multivariate analysis that is non-hierarchical cluster analysis  $k$ -Means with 38 countries as the data population. This analysis is done repeatedly until the obtainment number of clusters which is capable to show the differentiator power of the three characteristics and describe the high similarity within clusters. Based on the results, it turns out with 6 clusters can describe the differentiator power of characteristics of formed clusters. However, to answer the purpose of the study, only one cluster which will be taken accordance with the criteria of success for the population of countries that have similarities with Indonesia that cluster contain Indonesia therein, there are countries which is sustain crisis and non-crisis of rice in 2008, and cluster which is have the largest member among them. This criterion is met by cluster 2, which consists of 22 countries, namely Indonesia, Brazil, Costa Rica, Djibouti, Dominican Republic, Ecuador, Fiji, Guinea-Bissau, Haiti, India, Jamaica, Japan, Korea South, Madagascar, Malaysia, Mali, Nicaragua, Panama, Peru, Senegal, Sierra Leone and Suriname.

## 1. Introduction

In 2007-2008 recorded as the world rice crisis [5]. It is marked with an extremely increasing of rice prices in the world market, it was reached 2.852 times higher between October 2007 and May 2008 [4]. Not a few countries in Asia and Africa affected by the rice crisis. Indonesian Government should be responsive to the situation that afflicted these countries. Why? Because the rice crisis can also afflict Indonesia. It is because majority of Indonesian consume the rice as one of their staple food.

Indonesian Government needs a predictor to look for the potential of rice crisis in Indonesia in the future. Therefore, some researchers do studies in order to know the strength and predictability of indicator called Unprecedented Restlessness (UR) to detect the occurrence of rice crisis in the future. However, there are still less of data to describe the economic situation In Indonesia to predict the rice crisis in the future, it creates fears of uncertainty to look for the dynamics of rice crisis in Indonesia. Therefore, the researchers used the data of countries that assumed have similar characteristic to

