2. Between explanatory variables there should be no multicollinearity: to the extent that one independent is a linear function of another independent, the problem of multicollinearity will occur in logistic regression, as it does in OLS regression. As the correlation among each other increase, the standard errors of the logit (effect) coefficients will become inflated. Multicollinearity does not change the estimates of the coefficients, only their reliability. High standard errors flag possible multicollinearity (www.chass.ncsu.edu).

Biplot Analysis

Biplot similarity provides plots of the n observations, but simultaneously they give plots of positions of the p variables in two dimensions. Furthermore, superimposing the two types of plots provides additional information about relationships between variables and observations not available in either individual plot (Jolliffe, 2002).

The plots are based on the singular value decomposition (SVD). This state that the (n x p) matrices **X** on observations on p variables measured about their sample means can be written

$$\mathbf{X} = \mathbf{ULA}'$$

where **U, A** are *(nxr),(pxr)* matrices respectively, each with orthonormal columns, **L** is an *(rxr)* diagonal matrix with elements $t_1^{1/2} \geq t_1^{1/2} \geq \ldots \geq t_r^{1/2}$, and r is the rank of X.

To include the information on the variables in this plot, we consider the pair of eigenvectors. These eigenvectors are the coefficient vectors for the first two sample principal components. Consequently, each row of matrix positions a variable in the graph, and the magnitudes of the coefficients (the coordinates of the variable) show the weightings that the variable has in each principal component. The positions of the variables in the plot are indicated by a vector.

MATERIAL AND METHODS

Source of Data

The data used in this study were collected from the KNPDT. These data were derived from data Potensi Desa (Podes) 2005 and Survei Sosial Ekonomi nasional (Susenas) 2006 conducted by Central Bureau of Statistics (CBS). The data consists of five categories as response variable and 33 explanatory variables which can be seen in Appendix 1.

Method

The methods used in this research were:

1. Data preparation.
   This step consist of selecting regencies with backward region status namely fairly backward, backward, very backward and the most backward regions.
2. Early data description.
3. The assumption of a logistic regression examination.
4. Data analysis.
   Analyze selected data with ordinal logistic regression. This analysis is conducted for each sub criteria of determining backward region status.
5. Determine the prior factors that influence backward region status.
6. Significant variables were further analyzed through biplot and then explain the relationship of these variables based on globally and part of regions (west and east).

The Software used in this research are Microsoft Excel 2007, Minitab 14, SPSS 13 and SAS 9.1.

RESULTS AND DISCUSSION

Early Description

According to the data released by KNPDT, there are 434 regencies in Indonesia. KNPDT has determined five categories of region index and status based on six major criteria, such as (1) economic, (2) human resources, (3) infrastructures, (4) regional finance, (5) accessibility, and (6) characteristic of region. Each criteria has indicators which are relevant to measure the criteria score. Then the GoI calculated region score with giving weight for each criteria based on their experiences and then multiply it with standardized data.

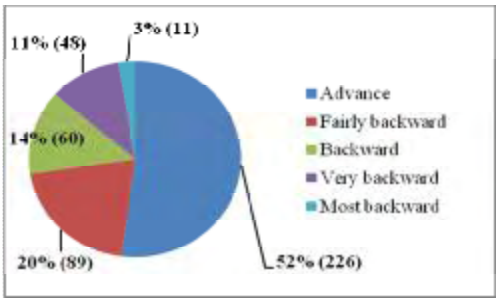

Figure 1. The number and percentage of regency with each status

Regencies with advance status were not used in this analysis because this research

focused on backward region status. Hence, the data which were used in this research were just 208 regencies with status namely fairly backward, backward, very backward and the most backward regions. According to the minister of KNPDT, the acceleration development in backwards regions is an absolute requisite for nation advancement especially in integration sector (Karel, 2008).

Before modeling the data, there should be an examination towards the assumption of ordinal logistic regression. First, examined the multivariate outliers with mahalanobis distance. There were 11 outliers that can be seen in the table below. The outliers can be removed from the data. Hence, just 197 regencies were used in this analysis.

Table 1. Name of regencies that are outliers

Province	Name of Regencies	Backward Region Status
Bengkulu	Seluma	Backward
Jambi	Batanghari	Fairly Backward
Kalimantan Barat	Bengkayang	Fairly Backward
	Sintang	Fairly Backward
Lampung	Way Kanan	Backward
Riau	Pelalawan	Fairly Backward
Sulawesi Selatan	Bulukumba	Fairly Backward
	Gowa	Fairly Backward
	Luwu	Backward
Sulawesi Tenggara	Bombana	Backward
	Kolaka	Fairly Backward

The second assumption was there should be no multicollinierity. For examining this assumption, we examine the correlation among the explanatory variables. After counting the correlation, there were strong correlation between variables, which can be seen in the table 2.

Table 2. Variables with strong correlation

Variables*)	Pearson Correlation
X22 and X23	0.85
X24 and X25	0.89
X28 and X29	0.85

Multicollinierity problem can be overcame by deleting one of the paired variables that were strongly correlated. Variables that were deleted from the explanatory variables were X23 (the percentage of malnutrition people above five), X24 (infant mortality rate), and X28 (average of health infrastructure distance). Hence, there were only 30 explanatory variables used in this analysis.

Prior Factors that Influence Backward Region Status

As the result of ordinal logistic regression between Y (response variable) and each major criteria, just one major criteria which consist of 1 explanatory variable was not statistically significant. This criteria was regional finance criteria. There were just 10 from 30 explanatory variables that were statistically significant based on ordinal logistic regression.

Appendix 2 to 7 described the result of each ordinal logistic regression that has a p-value of G test less than 0.05, except for regional finance criteria. This indicated that these models provide an adequate description of the data. In the following paragraphs we can see the result of each criteria individually.

Economic Criteria

The GoI has determined two sub criterias for Economic criteria. That were the percentage of poor people and poverty index. The result of ordinal logistic regression is shown in table below.

Table 3. Values of significant estimation parameter of economic criteria

Major Criteria	Variable*)	Odds Ratio	p-value Wald Test
Economic	X11	0.95	< 0.0001
	X12	0.65	< 0.0001

The significant explanatory variables of Economic criteria were the percentage of poor people (X11) and poverty index (X12). The cumulative logit of ordinal logistic regression model is given by the equation below.

$$\hat{L}_j(\underline{x}) = \text{constant}_{(j)} - 0.055\ X11 - 0.435\ X12$$

Values of constant $_{(j)}$ for j = 1,2,3 in the logit of ordinal logistic regression model were constant for response category 1 (fairly backward), 2 (backward), and 3 (very backward). Interpretation of ordinal logistic

regression model was similar for each major criteria. For example, in economic criteria. X11 (the percentage of poor people variable) has an estimated parameter equal to -0.055. This indicated that the estimated odds ratio for the increasing of 1% of poor people is $e^{-0.055}$= 0.95, it means that when the percentage of poor people increases then the probabilities of becoming a backward region would definitely increase.

The most critical political-economic issue facing Indonesia is poverty reduction. Poverty in Indonesia, measured in income terms, affect 48% of Indonesia's total population of 220 million. The government's Medium Term Development Program aims to reduce the poverty head count from 18.2% in 2004 to roughly 8.4% by 2009 (Sudarsono, 2007). Therefore, the GoI needs to reduce the percentage of poor people and poverty index in backward region in Indonesia.

Human Resources Criteria

The GoI has determined 13 sub criterias for human resources criteria. It consists of employment, health and education sector. The result of ordinal logistic regression is shown in table below.

Table 4. Values of significant estimation parameter of human resources criteria

Major Criteria	Variable*)	Odds Ratio	p-value Wald Test
Human Resources	X22	0.87	< 0.0001
	X25	1.27	< 0.0001
	X29	0.96	< 0.0001
	X211	0.93	0.006

The significant explanatory variables of human resources criteria were the percentage of malnutrition children under five (X22), live expectancy (X25), the percentage of access to health infrastructure (X29), and average number of Elementary school Drop Out students (X211). The cumulative logit of ordinal logistic regression model is given by the equation below.

$$\hat{L}_j(\underline{x}) = \text{constant}_{(j)} - 0.142\ X22 + 0.214\ X25 - 0.041\ X29 - 0.075\ X211$$

An example of interpretation of the explanatory variable X25 (live expectancy) will be given by having an estimated parameter equal to 0.214, indicated that the estimated odds ratio for the increasing of live expectancy is $e^{0.214}$= 1.27. It means that when live expectancy increase then the probabilities of becoming a backward region would definitely decrease.

Human resources criteria, one of most influential factors of backward region status that consists of health, education, and live expectancy sectors. The government has continuously improved the Indonesian educational system and human resources development especially in backward regions. Many programs related with these sectors should be implemented in backward regions.

Infrastructure Criteria

The GoI has determined 9 sub criterias for infrastructure criteria. It consists of transportation infrastructure, electricity, telephone, bank, and market sector. The result of ordinal logistic regression is shown in table below.

Table 5. Values of significant estimation parameter of infrastructure criteria

Major Criteria	Variable*)	Odds Ratio	p-value Wald Test
Infrastructure	X35	1.07	< 0.001
	X39	1.03	0.008

The significant explanatory variables of infrastructure criteria were the percentage of family using electricity (X35) and the percentage number of rural areas with nonpermanent market (X39). The cumulative logit of ordinal logistic regression model is given by the equation below.

$$\hat{L}_j(\underline{x}) = \text{constant}_{(j)} + 0.067\ X35 + 0.028\ X39$$

The government has continuously improved the infrastructure especially in backward regions. Many programs such as providing electric installation and road development should be implemented in backward regions.

Comparing with India, the backward regions is a result of many factors but mainly caused by their poor infrastructure such as roads, communication, irrigation, schools and healthcare facilities (Assam, 2007).

Regional Finance Criteria

The GoI has defined fiscal gap as regional finance criteria. Fiscal gap was measured by substracting the region income with region expenditure. Particularly for region finance criteria, the result of ordinal logistic regression with response variable backward region status and explanatory variables of region finance criteria has a p-values 0.7 for the G test (more than 0.05). It indicated that this model doesn't provide an adequate description of the data. Wald test reveals that the region finance criteria named fiscal gap was statistically insignificant.

Accessibility Criteria

The GoI has determined average distance between "kantor desa"(village office) and "kantor kabupaten"(district office) for accessibility criteria. The result of ordinal logistic regression is shown in table below.

Table 6. Values of significant estimation parameter of accessibility criteria

Major Criteria	Variable*)	Odds Ratio	p-value Wald Test
Accessibility	X51	0.98	< 0.0001

The significant explanatory variables of the accessibility criteria were the average distance between "kantor desa"(village office) and "kantor kabupaten"(district office) (X51). The cumulative logit of ordinal logistic regression model is given by the equation below.

$$\hat{L}_j(\underline{x}) = \text{constant}_{(j)} - 0.024\ X51$$

Basic infrastructure services is important to sustain economic growth and improve people's standards of living. Accessibility and characteristic of regions also give an influence to accelerate the development of backward region status. Many programs should be implemented by the GoI to overcome the problems in infrastructure sectors in backward regions.

Characteristic of Region Criteria

The GoI has determined 7 sub criterias for characteristic of region criteria. It consists of rural areas earthquake, flood, landslide and the other disasters. The result of ordinal logistic regression is shown in table below.*

Table 7. Values of significant estimation parameter of characteristic of region criteria

Major Criteria	Variable*)	Odds Ratio	p-value Wald Test
Characteristic of Region	X66	0.98	0.001

The significant explanatory variables of characteristic criteria was the percentage of rural areas with critical land (X66). The cumulative logit of ordinal logistic regression model is given by the equation below.

$$\hat{L}_j(\underline{x}) = \text{constant}_{(j)} - 0.023\ X66$$

Generally, according to ordinal logistic regression, there were only five from six major criteria that influences the backward region status. It was not appropriate with the government's criteria. The GoI must consider not to include the region finance indicator or choose another indicator for the characteristic of region criteria.

Biplot Analysis of All Indonesian Backward Regions

Figure 2 shows that the biplot represents 98.5% of the total variance in the data. First axis gives 95.6% and second axis gives 2.9% for total variance.

Biplot in figure 2 show that fairly backward regions were influenced by X25 (live expectancy) and X39 (the percentage number of rural areas without nonpermanent market). Backward regions were most influenced by X35 (the percentage of family using electricity). Very backward regions were most influenced by X11 (the percentage of poor people), X29 (the percentage of access to health infrastructure), and X51 (average distance between "kantor desa" (village office) and "kantor kabupaten" (district office)). Most backward regions were most influenced by X12 (poverty index), X22 (the percentage of malnutrition children under five), X211 (average number of Elementary school Drop Out students), and X66 (the percentage of rural areas with critical land).

*) The name of variable are listed at the appendix 1

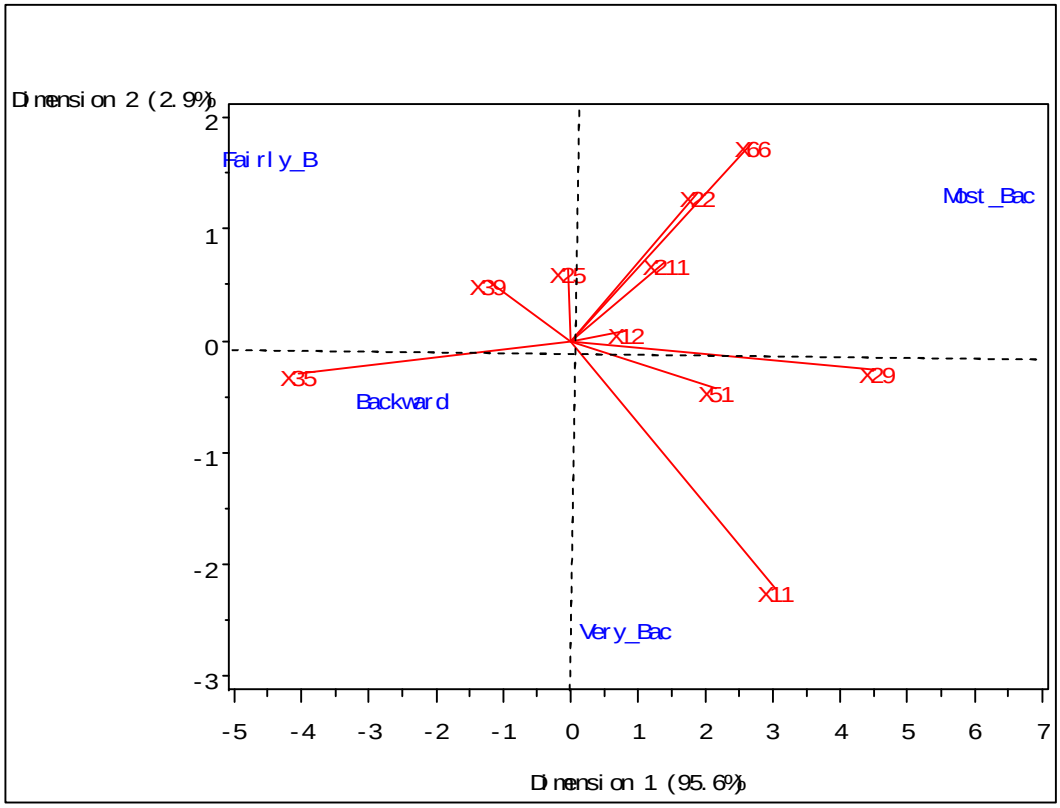

Figure 2. Biplot of all Indonesian backward region

Explanation :

Fairly_B	= Fairly backward regions
Backward	= Backward regions
Very_Bac	= Very backward regions
Most_Bac	= Most backward regions

According to the biplot analysis, many programs related with these sectors should be implemented in each backward region's category. The GoI should consider many programs that related with these significant explanatory variables as first priority of development.

Biplot Analysis of Western and Eastern part of Indonesian Backward Regions

According to KNPDT, there are large gap among backward regions of western and eastern part of Indonesia. Hence, it's important to know which variables in west and east part of Indonesia that influence backward region status.

Figure 3 shows that the biplot represents 91.7% of the total variance in the data. First axis gives 83,7% and the second axis gives 8% for total variance. Biplot in figure 3 shows that fairly backward and backward regions in the western part of Indonesia were most influenced by X39 (the percentage number of rural without nonpermanent market) whereas very backward regions are mostly influenced by X29 (the percentage of access to health infrastructure), X211 (average of Elementary school Drop Out students), and X51 (average distance between "kantor desa" (village office) and "kantor kabupaten" (district office)). Fairly backward and backward regions in eastern part of Indonesia were most influenced by X25 (live expectancy) and X35 (the percentage of family using electricity). Very backward and most backward regions in eastern part of Indonesia were most influenced by X11 (the percentage of poor people), X12 (poverty index), X22 (the percentage of malnutrition children under five), and X66 (the percentage rural areas with critical land).

There are ten thousands children on a remote island chain in eastern Indonesia are not getting proper nutrition. At least 39.080 children in the province of West Nusa

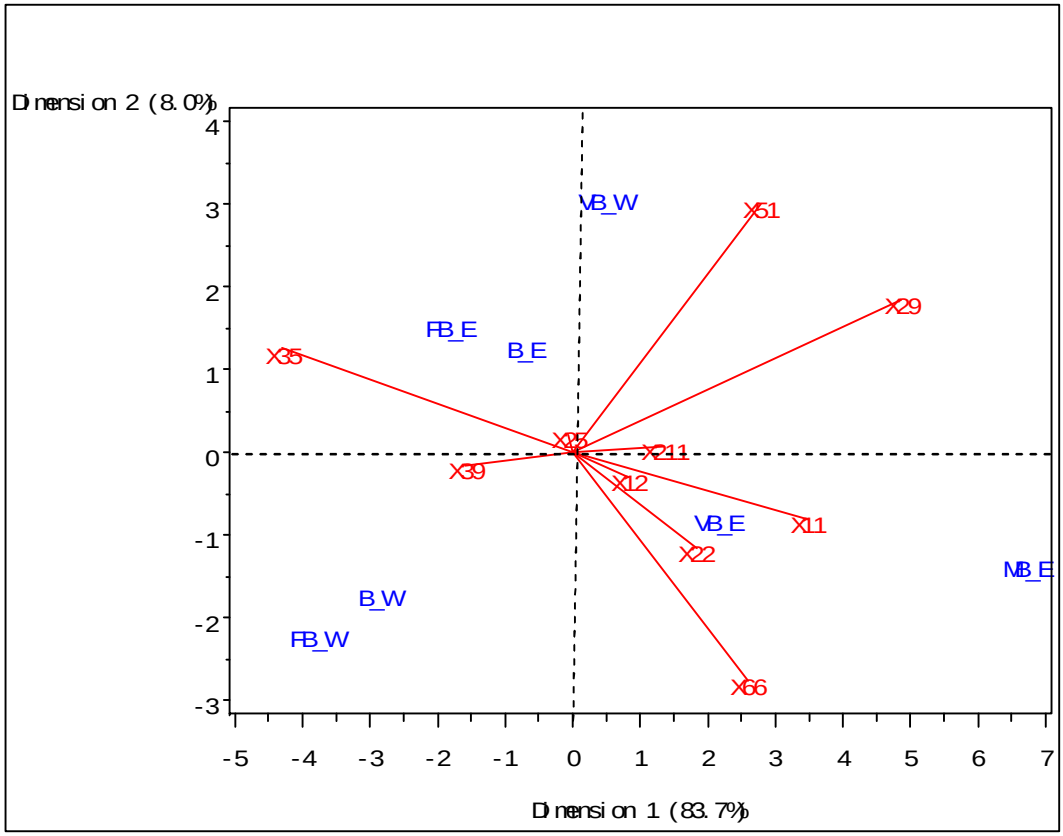

Figure 3. Biplot of western and eastern part of Indonesian backward region

Explanation :

FB_WI	= Fairly backward regions in western part of Indonesia
B_WI	= Backward regions in western part of Indonesia
VB_WI	= Very backward regions in western part of Indonesia
FB_EI	= Fairly backward regions in eastern part of Indonesia
B_EI	= Backward regions in eastern part of Indonesia
VB_EI	= Very backward regions in eastern part of Indonesia
MB_EI	= Most backward regions in eastern part of Indonesia

Tenggara suffer from malnutrition (AFP, 2005).

CONCLUSION AND RECOMMENDATION

Through ordinal regression logistic analysis, there were only 5 from 6 major criterias that were influencing to backward region status. These significant criterias were economic, human resources, infrastructure, accessibility, and characteristic of region criteria. Regional finance didn't give significant influence to backward region status. Although it's not influence, but it didn't mean that should be ignored.

Based on ordinal logistic regression, there were 10 out of 30 explanatory variables that influence the backward region status. There were lots of variable used by the GoI in the analysis, it makes the possibility of the high correlation between the variables and also it could result inefficient variables. Therefore, the GoI need to be more concerned upon variables that give significant influence to the backward region status in order to create an effective and efficient development strategy, so that the improvement of the backward region would be carried out more successfully.

The biplot analysis could represent the most influencing factors that most influence in each backward region status at western and eastern part of Indonesia. Very backward regions were mostly influenced by X29 (the percentage of access to health infrastructure), X211 (average of Elementary school Drop