UNDERSTANDING POVERTY IN THE DEVELOPMENT CONTEXT AND POVERTY REDUCTION POLICY USING SYSTEM DYNAMICS APPROACH

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ASBTRACT

Poverty is an undesirable phenomenon of development with the main characteristic of lack of welfare which might lead to some social problems such as criminality, low-level education and poor health condition. Generally, since 2000, Indonesia has been experiencing the decrease number of the poor with its up(s) and down(s) performance. The objective of this study is to explore how the poverty is constructed in the context of socio-economic and how the poverty alleviation policy plays a role in combating the national poverty. In this study, the poverty is seen from the perspective of absolute poverty indicated by the poverty line launched by the Central Bureau of Statistics. Conducted with System Dynamics approach, the model simulation results several following findings: (a) the poverty is simply constructed of the expenditure interaction, expenditure distribution, and poverty line; (b) if the budgeting of the poverty alleviation which has direct impact to the society is not being considered in the model then it will cause to the increasing percentage of the national poverty by 15%-18%; and (c) various mechanisms of policy direction in the macro level and long term period that could be implemented are as followed: (1) price control; (2) improvement of the society expenditure distribution; and (3) wage adjustment particularly for the low-income group.

Keywords: Poverty; Poverty Line; Expenditure Distribution; System Dynamics

INTRODUCTION

Poverty is an undesirable phenomenon in the development context for all development actors. World Bank (2000) defines the poverty as a deprivation of wellbeing (as cited by Santiko, 2009). This deprivation of wellbeing is caused by the deprivation of access to the matters which raises that wellbeing. This can be generated by the inability of individuals in accessing the sources of the wellbeing. As a result, this poverty phenomenon might lead to another phenomenon such as demographic, economic, environmental, educational and the insurgence problems (Mubyarto, 1990 in Wahyuni, 2016).

The poverty conditions are a multidimensional issue that has 4 dimensions, which are:

- absolute poverty; this kind of poverty refers to the individual basic need's fulfillment indicated by poverty line and expenditure;
- relative poverty; in this case, the poverty is seen based on its relative welfare distribution in an area; with this point of view, it is possible that there is no poverty in the society yet a group of society in the lowest level of income distribution can still be categorized as the poor/poorest in the perspective of relative poverty;
- structural poverty; the poverty that is related to the lack of access to the resources; and
- cultural poverty; the poverty that is related to the value and system adopted by an individual or community.

The declining trend of the absolute poverty occurs in Indonesia. This is calculated by the derivation of the poverty level which is formerly 19,12% by 2000 to be 10,17% by 2017 with some increases in several periods. If we take a closer look of year by year performance, it can be seen the fluctuating trend of the declining poverty. There were times (3 years) when it experienced the rising number of the poor. The retardation performance of decreasing poverty occurred in the last 3-4 years.
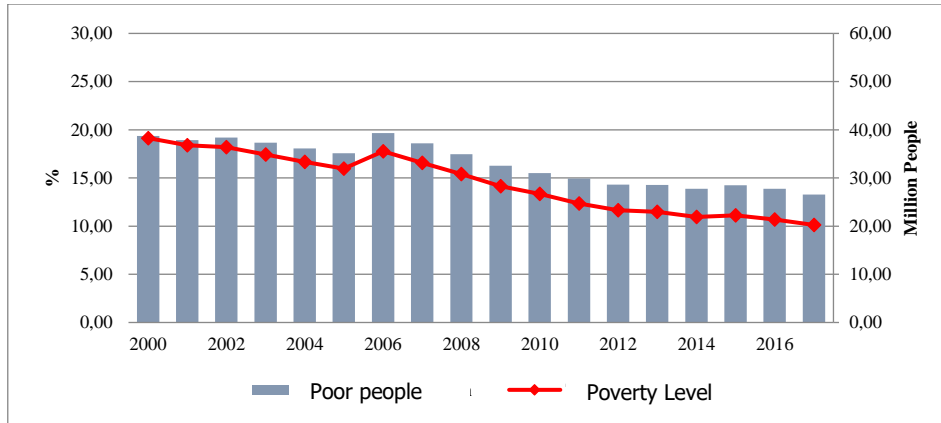
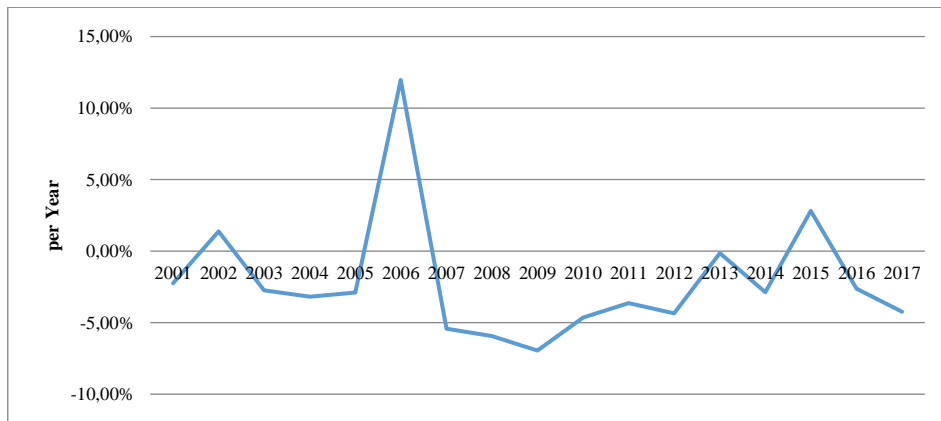Figure 1. Poverty Condition in Indonesia

Figure 2. Diminishing Rate of the National Number of the Poor
Note: > 0% number of the poor grows and < 0% number of the poor declines

The declining trend of the absolute poverty occurs in Indonesia. This is calculated by the derivation of the poverty level which is formerly 19,12% by 2000 to be 10,17% by 2017 with some increases in several periods. If we take a closer look of year by year performance, it can be seen the fluctuating trend of the declining poverty. There were times (3 years) when it experienced the rising number of the poor, especially in the period 2005-2006 and period 2014-2015. These condition raises question: 'what happened at those periods?', 'whether poverty alleviation policies do not work effectively or other factors that have a worse impact in poverty behavior?'

Based on the phenomenon, research is aimed at understanding how policies affect poverty in terms of how poverty shaped. This goal will have implications for perception of policy makers about poverty and open opportunities ahead in poverty alleviation itself. The consequences of the research objectives are the use of relevant definitions of poverty, the use of methods that can portrayed the phenomenon of poverty occurring in a certain period, and the use of data that is relatively easy to obtain and describe poverty in the relations of its constituent elements.

Therefore, this research is directed at the definition of BPS poverty (absolute poverty), whose data is one of the key indicators of development; through the identification of related aspects of poverty using systemic framework and their relation to policy for National Poverty as scope of research.

METHOD

"we live in a complex of nested feedback loops. Every action, every change in nature, is set within a network of feedback loops." (Forester, 1969)

As directed in introduction part, in research, an approach that can reflect the relationship of various indicators in shaping poverty is needed and these relationships can be displayed in quantitative indicators that can be understood by people. To accommodate that need, researchers was employed System Dynamics Approach.

System dynamics is a method for improving learning about complex systems. To be able to obtain good learning about complex systems, several requirements are needed, namely: (a) a tool to obtain and represent the mental model that we have about a problem; (b) formal models and simulation methods to test and correct the mental models we have, design new policies, and implement them; (c) methods for sharpening scientific reasons. System dynamics are fundamentally interdisciplinary, focuses on several disciplines such as social and cognitive psychology, economics, and other social sciences because of the application of system dynamics to be able to see social / human behavior (Sterman, 2000).

In practical way, System Dynamics is a computer-aided approach to policy analysis and design. It applies to dynamic problems arising in complex social, managerial, economic, or ecological systems—literally any dynamic systems characterized by interdependence, mutual interaction, information feedback, and circular causality (https://www.systemdynamics.org/what-is-sd).

For the research purpose; as illustrated in Figure 3, System Dynamics modelling is used to explore and understand the structure which constructs the poverty especially the absolute poverty in Indonesia. System Dynamics modelling is configured with the comprehension that the behavioral phenomenon is resulted of the structure existence.
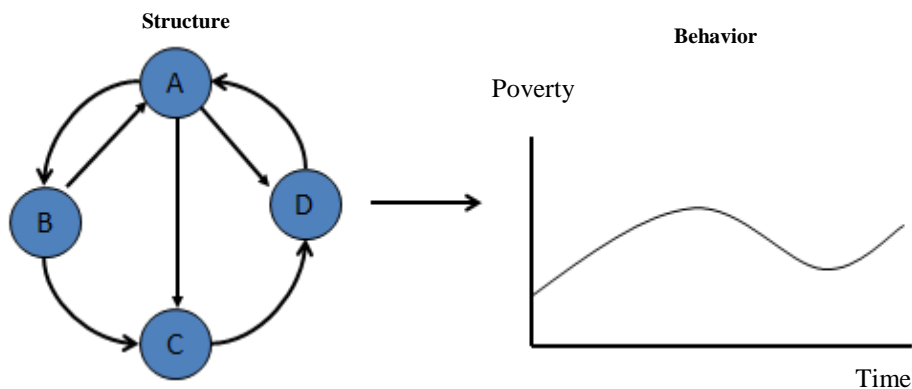

Figure 3. Basic Principle of System Dynamics

Structure is formed of several interrelation components with the linkage pattern as follows:

- Feedback; In the relationship between various components in the phenomenon, always there are feedback between those components. System Dynamics accommodate the feedback that exist in a phenomenon to be modeled.
- Stock and flow; there are elements in the real world that are in the form of reservoir that accumulate the quantity of a phenomenon, such as total land area, petroleum reserves, etc. and there are those that are flowing such as birth and death of the population, etc.

- Delay; In the real world often encountered changes do not occur suddenly, but delay occurs because of the flow of information or material that causes the condition. examples of delays are the construction of gas pipelines, infrastructure development, and changes in land use change
- Non-linearity; The change in causes are often not proportional to the change in the consequences, and what happens in an area does not necessarily occur in other regions

This basic principle and its linkage pattern then are positioned in the staging framework started from the problem identification, analysis, policy formulation and evaluation.
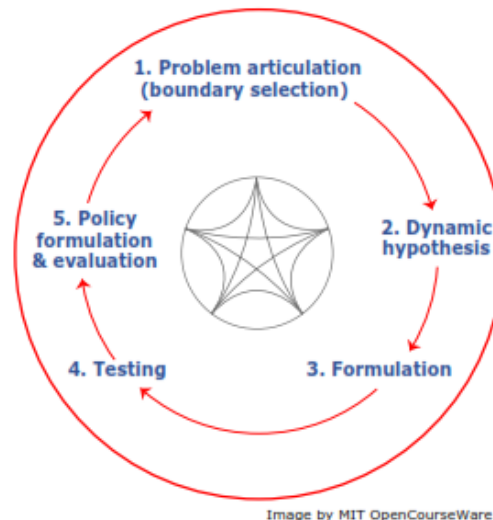
Figure 4. The Development Stages of System Dynamics Model

The following steps are the development stages of this study:
- determining the focus and problem of the absolute poor number referred to the Central Bureau of Statistics standard;
- formulating conceptualization of the system as a way of thinking a modelled phenomenon;
- developing a poverty formula model;
- testing model validation, simulation, and policy; and
- analyzing as well as assessing policy sensitivity on model performance.

In this study, data is gathered from the document publication and official website of the Central Bureau of Statistics. Data is used for input and validation process. Below, there are several data that collected for this research

Table 1 Data Collected in Research

No	Indicators	Scope	Year	Source	Data Purpose
1	Poverty Head Count	National	2000-2015	Statistical Agency (BPS)	Validation
2	Poverty Level	National	2000-2015	Statistical Agency (BPS)	Validation
3	Poverty Head Count Urban	Urban	2000-2015	Statistical Agency (BPS)	Validation
4	Poverty Head Count Rural	Rural	2000-2015	Statistical Agency (BPS)	Validation
5	Value Added Agriculture	National	2000-2015	Statistical Agency (BPS)	Input and Validation
6	Value Added Non-Agriculture	National	2000-2015	Statistical Agency (BPS)	Input and Validation
7	Input Output Table	National	2000, 2005, and 2010	Statistical Agency (BPS)	Input
8	Population	National	2000-2015	Statistical Agency (BPS)	Input and Validation
9	Urban Population	National	2000-2015	Statistical Agency (BPS)	Validation
10	Rural Population	National	2000-2015	Statistical Agency (BPS)	Validation
11	Agriculture Labour	National	2000-2015	Statistical Agency (BPS)	Input and Validation
12	Non-Agriculture Labour	National	2000-2015	Statistical Agency (BPS)	Input and Validation
13	Urban Labour	Urban	2000-2015	Statistical Agency (BPS)	Validation
14	Rural Labour	Rural	2000-2015	Statistical Agency (BPS)	Validation
15	Urban Wage Nominal	National	2000-2015	Proxy from Data Statistical Agency (BPS)	Input and Validation
16	Rural Wage Nominal	National	2000-2015	Proxy from Data Statistical Agency (BPS)	Input and Validation
17	GDP Deflator Agriculture	National	2000-2015	Statistical Agency (BPS)	Input and Validation
18	GDP Deflator Non-Agriculture	National	2000-2015	Statistical Agency (BPS)	Input and Validation
19	Unemployment Number	National	2000-2015	Statistical Agency (BPS)	Validation
20	Unemployment Rate	National	2000-2015	Statistical Agency (BPS)	Validation

Source: Statistical Agency (BPS)

RESULTS

in this section, will be explained the model development process until it is ready to be used for simulation / policy analysis

- **Problem Articulation**

Poverty definition as the main indicator reviewed is based on the calculation of the Central Bureau of Statistics. The Central Bureau of Statistics implements the concept of the ability in

fulfilling the basic needs approach. This approach views the poverty from the economic aspect as an inability in fulfilling the basic needs of food and non-food calculated from the expenditure. The food poverty line is an expenditure index of the minimum food needs which is equal with 2,100 kilocalories per capita per day and the non-food poverty line is the index calculating the minimum needs of non-food commodities. These non-food commodities have 51 components for the urban area and 47 components for the rural area. Meanwhile, the expenditure in that definition will be approached from the components of employment wage and social assistance or income support given by the government.
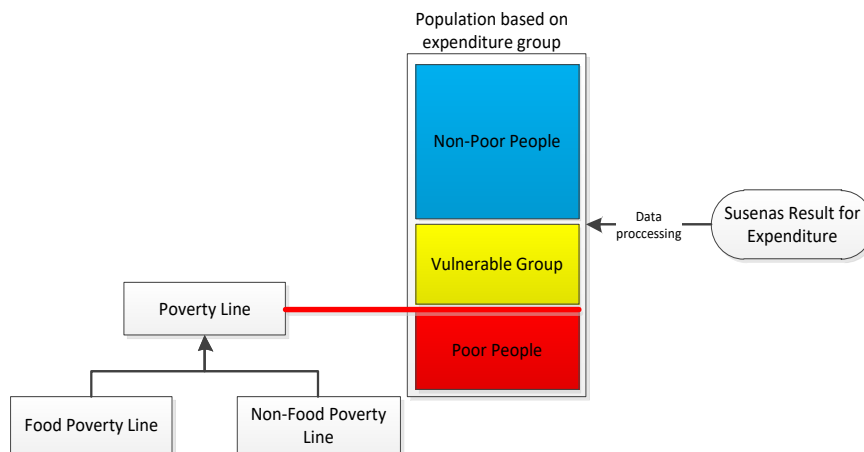
Figure 5. The Illustration of Poverty Established by the Central Bureau of Statistics

- **System Conceptualization**

    System conceptualization reflects the system framework that will be used to develop mathematical model of the phenomenon. It contains relationship between aspects of the phenomenon that called as causality. There are two types of causality used in system conceptualization:
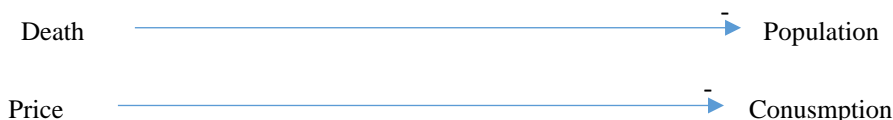
    - Positive Causality

        This causal relationship expresses a unidirectional change between cause and effect. This means that if the change of the cause become higher, then the effect is also become higher. Some illustrations of the causal relationship can be described as follows

        Population $\xrightarrow{+}$ Birth

        Birth $\xrightarrow{+}$ Population
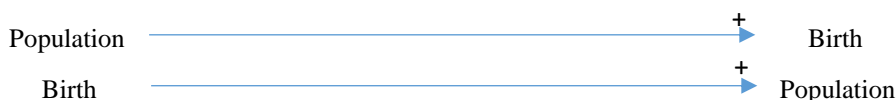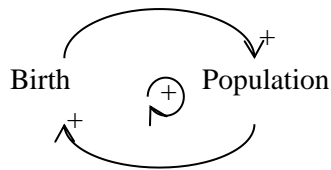
    - Negative Causality

        This causal relationship expresses a opposite direction of change between cause and effect. This means that if the change of the cause become higher, then the effect become lower. Some illustrations of the causal relationship can be described as follows

        Death $\xrightarrow{-}$ Population

        Price $\xrightarrow{-}$ Conusmption

    If one or more causal relationships form a closed circle, the circle is referred to as feedback. The two types of feedback that appear, are:

    - Positive Feedback/ Reinforcing/R (+)

        This feedback happened when causal relationship between components overally positive.

- *Feedback* Negatif/S*elf-Correcting/Balancing/*B

  Positive feedback occurs in conditions when a negative loop is formed because the causal relationship between the various elements is overall positive. In behavioral negative feedback tends to go towards a goal (goal seeking) even though it is not always explicit. Therefore, to make a goal look implicit, there is a gap. Feedback tends to limit the processes that occur in the system and try to find a balance (Sterman, 2000).
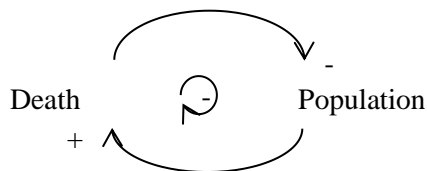
The causal loop diagram in this study can be seen in Figure 4 With the linkage between the poverty, poverty line, expenditure and the broader socio-economic dynamic. As for each causal loop represents:

- Causal Loop B1 depicts the feedback between population and economy by means of Gross Domestic Product (GDP) per capita;
- Causal Loop R1 illustrates the feedback between the total of GDP (added value) with the target of GDP (added value) in the next period;
- Causal Loop R2 shows the feedback between the total of GDP (added value) and the employment;
- Causal Loop R3 defines the feedback between price (GDP deflator) and inflation (the price change in the market);
- Causal Loop R4 determine the feedback between the inflation (the price change in the market) and wage; and
- Causal Loop B5 illustrates the feedback between the poverty level and the budget/poverty alleviation program where the government budget will increase the ability of the society expenditure.
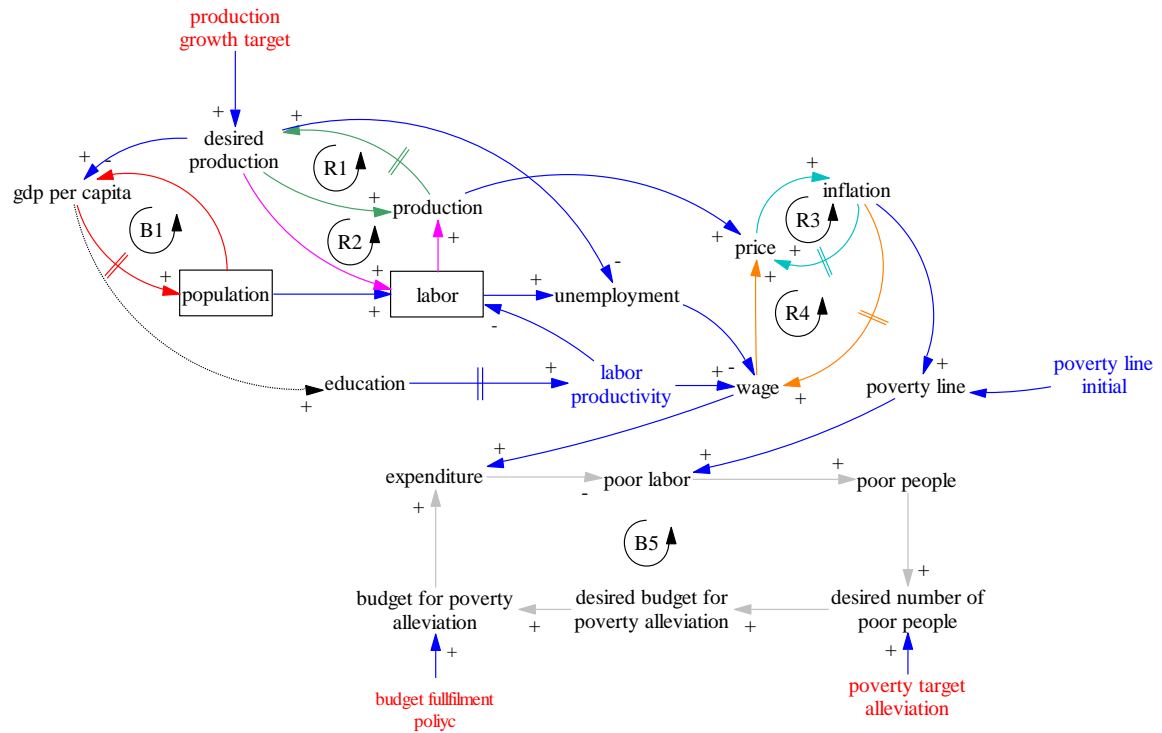
Red text: Policy spaces

Figure 6. The Causal Loop Diagram of Poverty Model

- **Model Formulation and Policy Aspect**

Model formulation is presented in the form of stock-flow diagram. This diagram is related to several aspects of economy, population, employment, wage, price, rural-urban distribution, social assistance or income support, and poverty itself. Only a few main and significant sub models are shown in this article.

The economic model is formulated of the supply-demand interaction in a way of input-output linkage. Final demand (household consumption, government consumption, investment, export and import) will be the primary mover for the output target that will have an effect to the production factor (capital and labor). The economic sub model development combines: (1) the Multiplier-Accelerator Model of Samuelson (1939), (2) the Inventory Adjustment Model of Metzler (1941), and (3) the Input-Output (I-O) Model of Leontief.
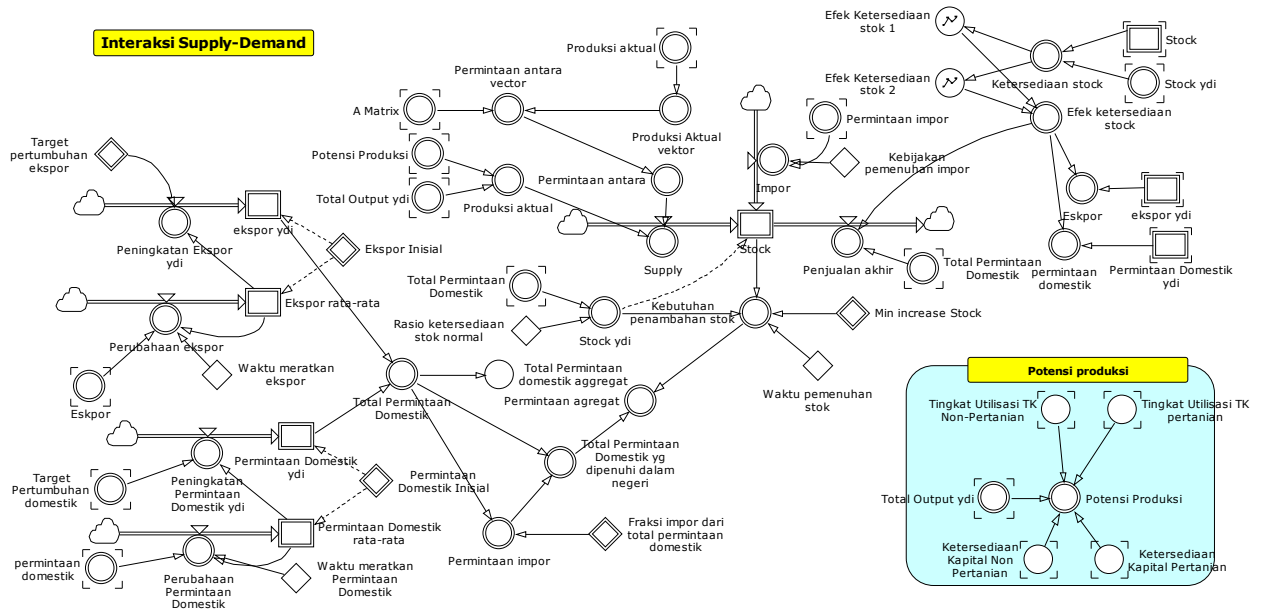
Figure 7. Stock Flow Diagram for the Economic Sub Model

The economic sub model will result the value added that will give an impact to the economic growth, expenditure distribution, as well as the ability of government funding in the poverty alleviation. Economic sub model will interact with the employment sub model where it is able to provide the information of the future labor adequacy. The main assumption in the economic sub model is capital needs is always fulfilled. As a result, it is assumed that there is no constraint to the future investment for all sectors in the economic aspect.
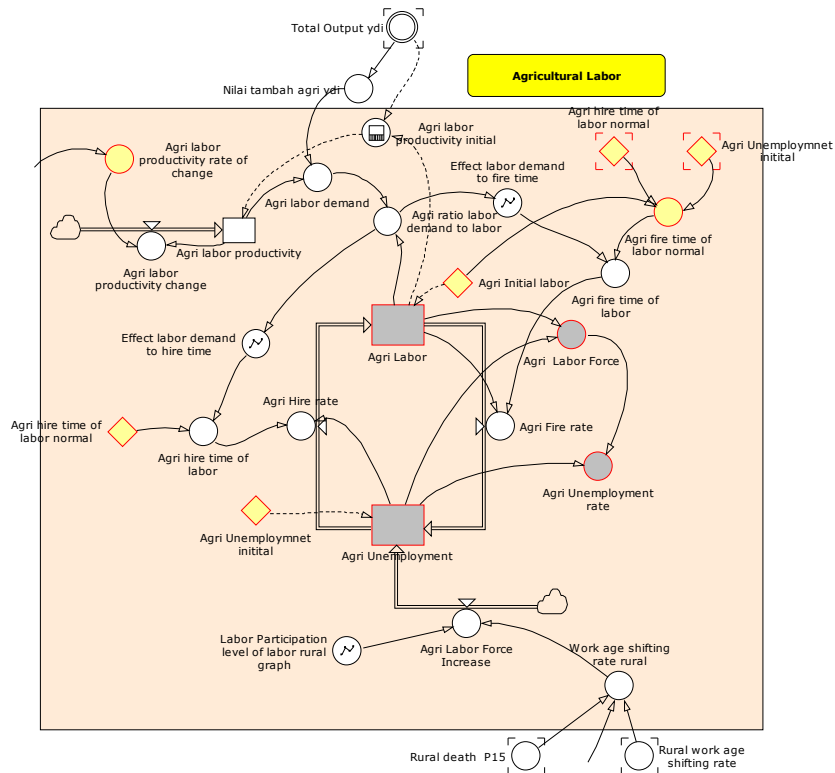
Figure 8. The Employment Sub Model

Employment distribution is another influencing sub model. The value added of the economic sub model will determine the total number of the employments who work on related sector. Alteration of the employment number strongly depends on the productivity (the ability per employment in producing output) and the available employment. In this sub model, the employment is classified into two main groups which are agricultural employment and non-agricultural employment. The alteration of the number of employments in this sub model is influenced by the population sub model with rural-urban dimension. Agricultural and non-agricultural dimension is developed to combine the poverty dynamic that will be calculated for rural-urban region.

The economic sub model will influence to the price shifting in the price sub model. The shifting price will be determined in consequence of economic equilibrium of supply-demand, perception of producer/related actors towards the shifting price itself and shifting of input cost due to changes of labor cost. The price in this structure is the distinction or ratio between current market prices and constant market prices in agricultural GDP and non-agricultural GDP. Accordingly, the model could not accommodate the shifting price in the micro scale. This shifting price inflation will also alter the poverty line.
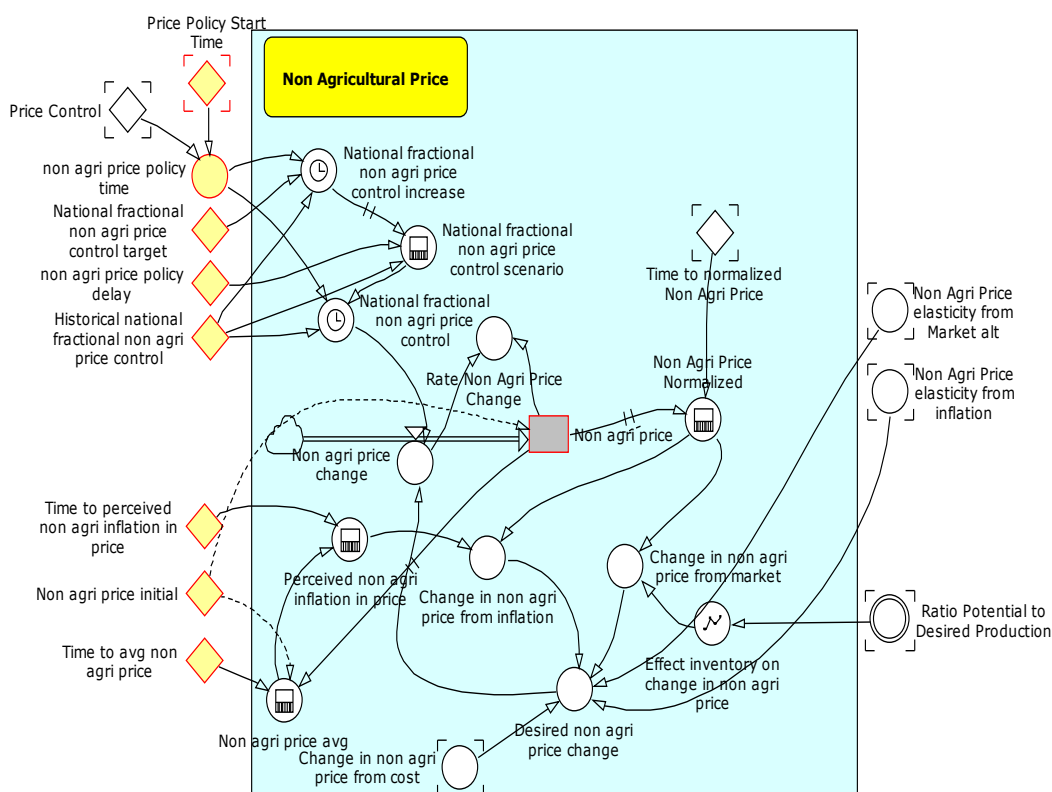

Figure 9. The Price Sub Model

The approach used in calculating the poverty sub model id the ratio between the expenditure average (from the wage and social assistance or income support) and the poverty line (changing by the inflation) in the means of normal distribution assumption. Social assistance or income support in this study is limited only in the context of budgeting or program which have direct impact to the community consumption (*Bantuan Langsung Tunai*-Temporary Unconditional Cash Transfer, *Program Keluarga Harapan*-Family Hope Program, *Beras Miskin*-Rice for the Poor, etc).
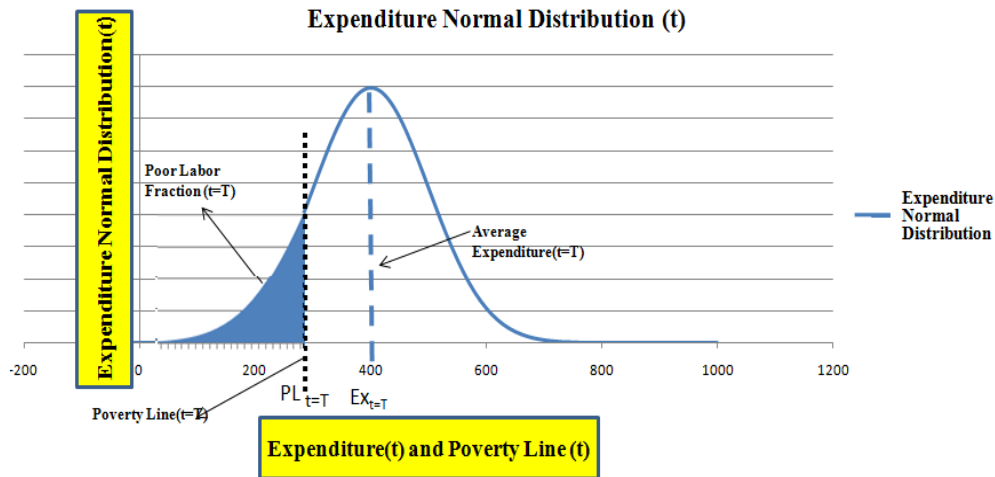
Figure 10. The Poverty Calculation Approach

- **Model Validation**

"Many modelers speak of model "validation" or claim to have "verified" a model. In fact, validation and verification of models is impossible. The word "verify" derives from the Latin verus-truth; Webster's defines "verify" as "to establish the truth, accuracy, or reality of." "Valid" is defined as "having a conclusion correctly derived from premises . . . Valid implies being supported by objective truth."

"By these definitions, no model can ever be verified or validated. Why? Because all models are wrong. As described in chapter l, all models, mental or formal, are limited, simplified representations of the real world. They differ from reality in ways large and small, infinite in number." (Sterman. 2000. Business Dynamics)

Model testing is mostly designed for proving that model constructed is "valid". On the other hand, the model itself has always deviation in the real world with or without validation process, Nevertheless, in order to the need for the use of the model itself, the model should at least be tested for understanding whether the model built has fulfilled or not the need of solving the desired problem.
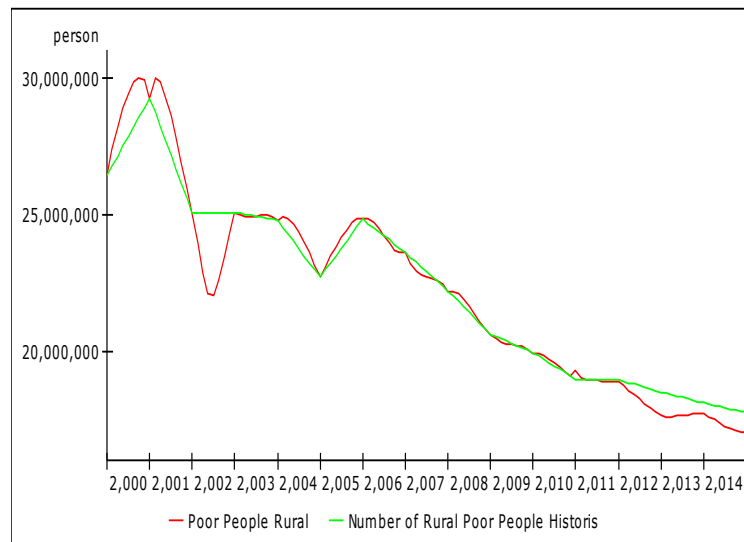

Figure 11. Theil Statistic for Rural Poor Population

Theil Statistic is one of the model tests that could be applied. Theil inequality statistics (Theil, 1966) can describe the error decomposition by dividing Root Mean Square Error (MSE) into 3

components which are bias proportion (UM), variance proportion (US) and covariance proportion (UC). The test result is shown by one following example. r value in the indicator comparison is relatively high (0,99) representing that the simulation result is relatively able explaining the dynamic of historical data. US value is relatively accepted even though it is not too ideal, and the UC value shows that the model is good enough in conceiving the model.

- **Simulation and Scenario Analysis**

In the initial exploration, the poverty calculation is simulated with and without government funding for poverty alleviation. There is some poverty level distinction by 2-4% in the historical period and in the long term will be increased despite it is estimated that a turning point will occur in 2024. The simulation result indicates that the poverty is potential increased to be 5-12 million in the period of 2015-2045 if the budget for poverty alleviation is not allocated.
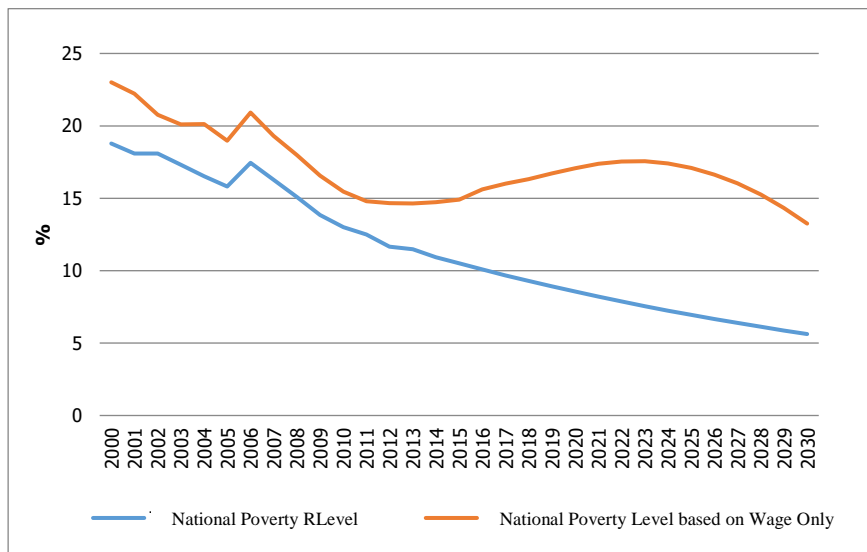

Figure 12. National Poverty Level (Historical Scenario)

On the other side, another analysis assumes that the government funding for poverty alleviation will be fulfilled with several following scenarios:
- Base economic growth in between > 6.75%-6.7% each year;
- moderate economic growth in between > 4.5%-4.7% each year; and
- the budgeting allocation fulfillment is only 50% by installment since 2015 (distracted budgeting scenario).
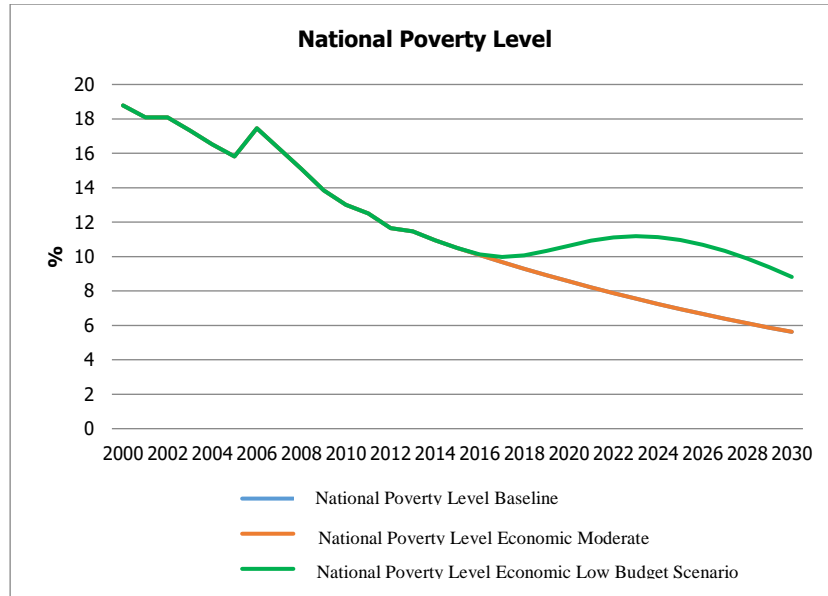
Figure 13. National Poverty Level (Base Scenario)

In the future, if it is assumed that the budget allocation for poverty alleviation cannot be fulfilled, the numbers of poor people will increase as shown in the previous figure. Thus, several other policies need to be implemented in order to reduce the poverty rate without relying on direct funding programs for consumption of poor people. Several explorations for policies resulted with several options that can be take:

- controlling the price with inflation control and price shifting for the commodities in the model;
- raising the wage by increasing the average wage in the model; and
- improving the income distribution by changing the shape of the normal curve in the model.
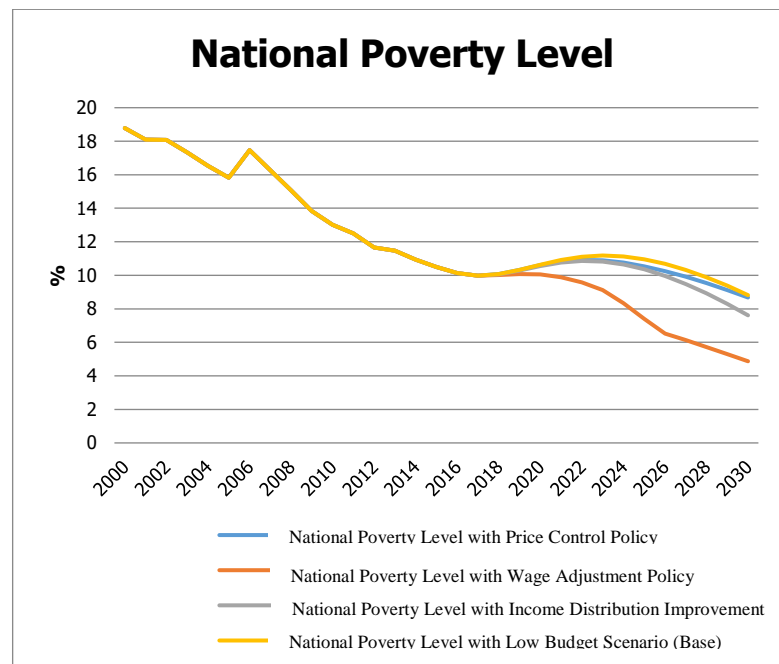

Figure 14. Poverty Level (Further Policy Scenario)

The results of the three scenarios (in the scenario of distracted budget allocation) demonstrate the difference implications to the poverty. The scenario of income distribution improvement and

price control shows the declining poverty since 2017, however it will again increase just like the behavior in the scenario of distracted budget allocation.

The results of the three scenarios (in the scenario of distracted budget allocation) demonstrate the difference implications to the poverty. The scenario of income distribution improvement and price control shows the declining poverty since 2017, however it will again increase just like the behavior in the scenario of distracted budget allocation.

Meanwhile, the scenario of wage increase offers the best performance among other scenarios. This scenario generates the deceasing poverty trend up to 4.8% by 2045. Moreover, if it is also compared to the Base Scenario, the wage increase scenario will demonstrate better result in alleviating the poverty in the long term.
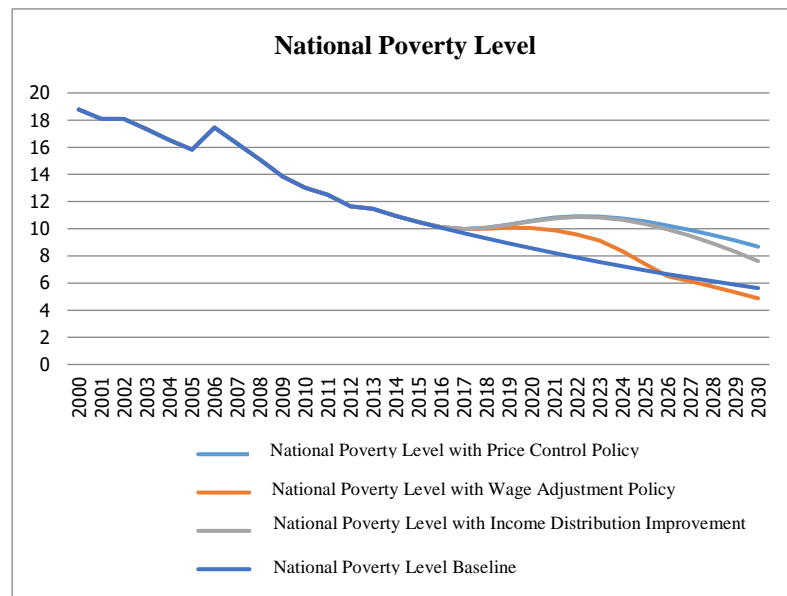

Figure 15. Poverty Level (Further Policy Scenario and Base Run)

DISCUSSION

With the assumption that poverty alleviation program reflected by the poverty alleviation budget (only cover the direct fund for people's consumption), Some things can be discussed related to national poverty as result of trend/condition or policy implementation for poverty. In the historical scenario, conducted a comparison of two situations between poverty measurement involves the budget of poverty alleviation and only depend on wage.

The result shown that poverty that only depend on wage have higher behavior than involved the budget of poverty alleviation. In historical period (2000-2015), both shown similar behavior, even though the magnitude is different. But after historical period, poverty that only depend on wage grow higher than the base condition. It seems like the distribution of income getting worse after 2016. But it will be getting better after 2024/2025 when poverty that only depend on wage show the decrease (even still higher than base condition). This condition indicates that after 2024/2025 there are improvement in income distribution among people of Indonesia, and this condition related with the improvement in wages as a result in increase in productivity (in model proxy by education level). This historical situation leads to several findings, such as:

- The role of the budget for poverty alleviation (directly) in determining poverty is quite significant, with a deviation of approximately 5-7 million poor people more without the involvement of direct poverty alleviation programs in the historical period, or 3-4%
- In the long term, without a program that has a direct impact on people's consumption capacity, the poverty rate is projected to increase until 2024. This is because if economic performance (especially income distribution) runs like historical changes it is not enough to offset projected price changes at the change in the poverty line. In this context, the consequences that occur are also the value of the budget that must be spent is also relatively greater to 'bear' the lives of the poor who are still not out of the low ability to get out of poverty itself.
- After historical period (2015), poverty alleviation budget plays the significant role to reduce the poverty. It directly affects the 'bad income distribution' that happened until 2030, the deviation between those two scenarios reach 10% of poverty level.

This scenario shows that the role of the government budget for poverty alleviation, especially programs directly affect the consumption still be one of the significant ways to reduce poverty. But in the other hand, the strategy is difficult to implement because it is needed the huge fund for it.

After identified the role of poverty alleviation budget, it is assumed if there is change in (1) economic growth and (2) Budget fulfillment for poverty alleviation programs/plan and see how it will react in the model. The findings of this simulation

- the economic growth will influence the wage shifting, income distribution and expenditure. Furthermore, the economy deceleration will raise the impact to the ability of wage increase, income distribution and the ability of consumption itself;
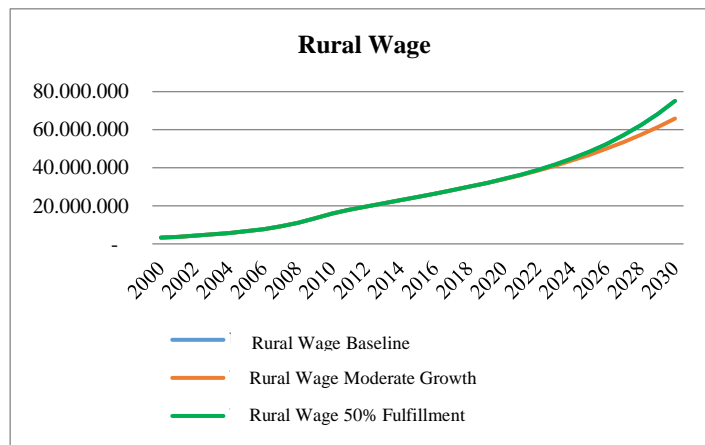

Figure 16. Rural Wage (Historical Scenario)

- Therefore, the lower economic growth will affect to the need of budget allocation of poverty alleviation due to lower wage growth;
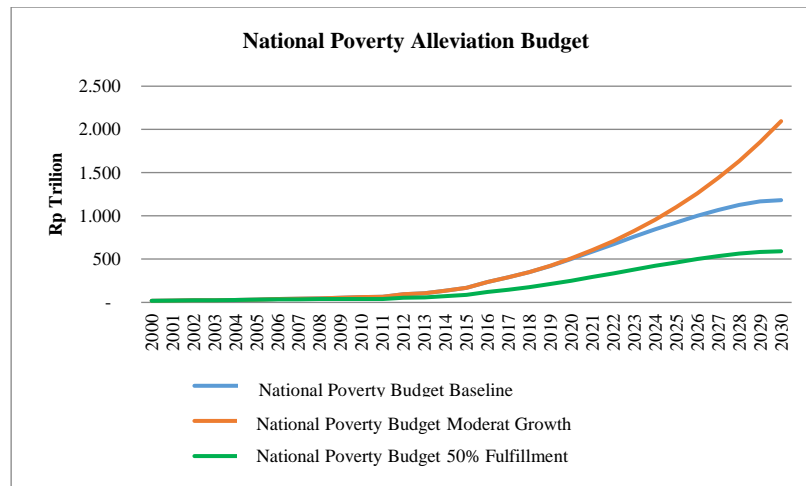
National Poverty Alleviation Budget

Figure 17. Rural Wage (Historical Scenario)

- In formulating a better strategy in combating the poverty even though budgeting allocation fulfillment is lower than it should be, there will be still an opportunity to develop another policy in balancing that condition and poverty alleviation will keep going well.

In the limited budget condition, increase in poverty must be handle by other options of policies. Using three options of scenarios; limited budget can be

- Wage Adjustment
  Definition of wages in this model used on average in the BPS data, which also relates to the labor in agricultural sector, wages of workers, income in the informal sector, and also comes from capital return owned by labor. Thus, payments made here cover all sectors and all activities.
  For the formal sectors, the issue of wage adjustment is still focused on the system and mechanism for calculating wages themselves according to Government Act 78/2015 (http://ksn.or.id/pengupahan-kondisi-riil/), entrepreneurs who do not comply with the provisions of the wage mechanism (https://ekonomi.kompas.com/read/2018/04/30/160329526/aneka-permasalahan-buruh-jelang-hari-buruh-sedunia) as well as labor productivity problems that are 'considered' not comparable to the wages given (http://apindo.or.id/id/press/read/masalah-upah-jadi-isu-krusial-untuk-tingkat-daya-saing-indonesia), this problem might determine that wage increases in Indonesia should be possible in context as follows:
  o Determination of minimum wages as has been done so far
  o Reviewing the wage mechanism based on Government Act 78/2015 to be able to better represent how the needs of recipients of wages are accommodated.
  o Increased productivity that will be related to wages through training / education for marginalized people so that in the future productivity will increase which will have an impact on income.
  o Attention to wage patterns / systems for informal workers, because legislation only speaks at the level of formal labor.
  Wage adjustment became the least feasible policy in government context because the role of government just as the regulator. The other actors like private, company, people also have roles for wage adjustment process. From the existing dynamics, the dependence of other parties besides the government in terms of providing wages to workers is still very

high, causing the choice of policy to increase wages in the long run to be something that is not easy for the government.

- Price control

  Price control is carried out so that public access to consumption (especially the economically weak community) is more secure, meaning that the level of income obtained by the weak economic community is still able to access the minimum needs in the poverty line. This policy can be done by:

  o Improved distribution of goods and services throughout Indonesia through both distribution and one-price policies

  o Development of economic centers as suppliers of community needs to facilitate the distribution of goods.

  o Price control on the input distribution components, especially fuel prices

  o Termination of the distribution mafia chain that damages the price of products on the market, especially in relation to food

  The price control scenario basically relies heavily on a strong distribution chain between inter-commodity regions in Indonesia. The involvement of various State High Institutions shows that the problem of food prices is a big problem in this country. The price increase ritual almost keeps repeating from time to time. The government has formed "The Availability and Stabilization Team of Basic Needs Prices" as a derivative of Presidential Regulation No. 71 of 2015 concerning Determination and Storage of Basic and Important Goods (http://id.beritasatu.com/home/strategipengendalian-harga-pangan/147313).

- Income Distribution

  Scenarios for improving income distribution provide relatively the same results with price controls. The scenario for improving own income distribution will be related to:

  o In the short term, with direct cash assistance or subsidies but with increased effectiveness

  o Improved allocation to direct assistance and opportunities for economic improvement for the community

  o Development of economic centers as a supplier of the needs of people who are difficult to reach in Indonesia and the absorption of local labor and weak economic groups

  In the context of Indonesia, Improvement of Distribution / Revenue is more directed at equalizing the increase in income (income) of Indonesian people to reduce the Gini ratio more quickly, both through regional approaches (regions with high poverty rates and many poor people) through a solid economic investment mechanism work, vocational education, access to small credit, village funds and through a cash direct approach to education, health and consumption as has been done today (http://presidenri.go.id/berita-aktual/langkah-nyata-mengurangi-ketimpangan-pendapatan.html),

With various conditions and opportunities in the implementation of these policies, it appears that the government's choice in poverty alleviation programs which can be directly carried out is related to improving income distribution, which is directed at increasing investment in regions with weak economies, improving the quality of human resources through education and health and cash assistance programs like what have been done so far. Price control is relatively possible with the role of government-owned logistics institutions and regulation of distribution.

The results and discussion in this study show that the role of productivity enhancement that has an impact on wages, improvement in income distribution, and price control has different levels of

significance in shaping poverty. Thus, further studies need to be directed towards how the mechanisms of income distribution, productivity, and prices are formed in more detail. Or in the macro field, this study can lead to development of SDGs as a system framework which poverty related to other goals in SDGs itself
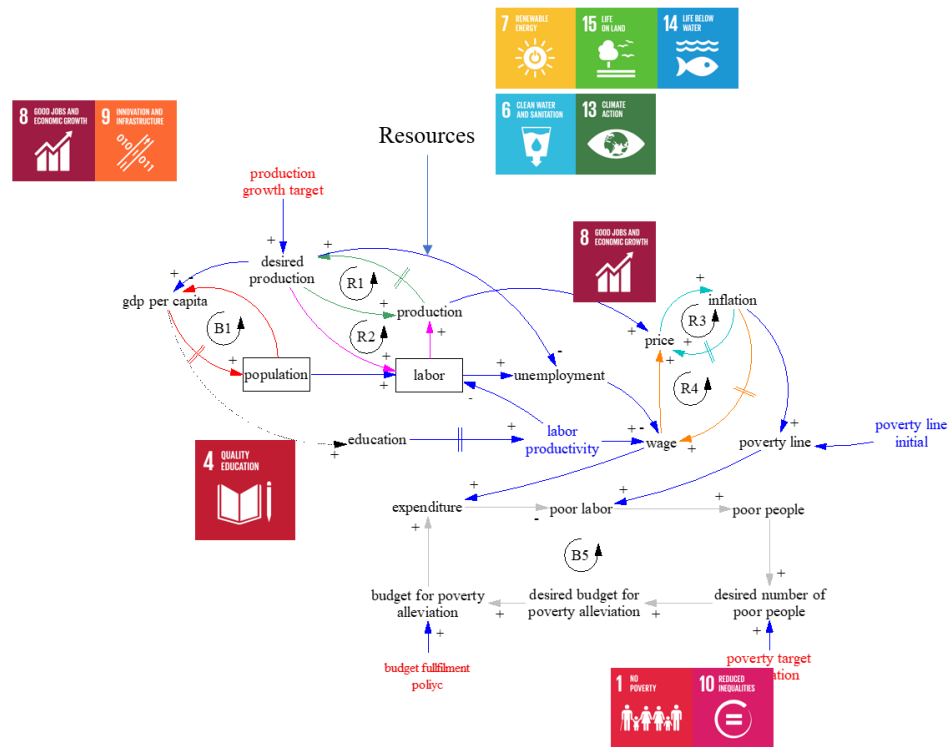

Figure 18. Idea of Integrated SDGs Goals Framework

In addition, as comparison with several studies about poverty, here are several results:

Table 2 Comparison Several Documents about Poverty in Indonesia

Document	Target year	Initial Values	Target	Projection/Realization	Precondition
Bappenas	2045	10,12% (2017)	0,02 %	2,7% (Model)	Inclusive Growth
RPJMN 2005-2009	2009	16,6% (2004)	8,2%	14,15%	
RPJMN 2010-2014	2014	14,15% (2009)	8% - 10%	10,96%	
RPJMN 2015-2019	2019	10,96% (2014)	7%-8%	9,98% (Mid 2018)	
SDGs	2030	10,12% (2017)	0% Extreme Poverty (1.25 $ PP)	5,62%	
Visi Indonesia 2030: Yayasan Indonesia Forum	2030	10,12% (2017)	<4%	5,62%	

CONCLUSION

In accordance with a series of analyses with the System Dynamics approach that has been conducted, the absolute poverty is built from the interaction between the poverty line and expenditure that is related to the broader socio-economic dynamic. In the means of system dynamics, it can be demonstrated that both interactions can be positioned in the causal loop framework which covers wage, price, inflation, employment, population, and macro economy.

In the historical condition, if the budgeting allocation for poverty alleviation is not being considered then it will affect to the higher poverty level by 2-4% which is more or less 5-7 million people and it is even potentially raise higher poverty level in the future. Likewise, for future simulation, without the budget allocation of the poverty alleviation, the poverty then will tend to be increased from 2010 t0 2026 and will show the declining trend later on. The poverty level is estimated increasing by 18% with the previous declining level by 15%.

Based on several policy analyses in combating the poverty without depending on direct cash on consumption oriented, policy direct that can be taking into account by the government in combating the poverty are as follows:

- wage increase or adjustment;
- price control; and
- income distribution improvement.

In the short term, a stimulation in the form of direct cash can be done to prevent the additional vulnerable group to become the poor. Yet for the long term, there 3 options for the policy direction that can be considered to be implemented and combined subsequently as follows:

- income distribution improvement by creating conducive climate as many as possible that can attract the income increase for the marginal group;
- price controlling by strengthening the function of logistic institution and controlling the distribution of goods and services; and lastly
- strengthening the wage system by regulating and controlling half or more formal workers in Indonesia.

For the further research/study, this study can lead into two direction of development:

1. More detail in poverty shaping, especially related to how price shape, income distribution, and productivity of labor change
2. Development of System Framework for SDGs Goals that connected several SDGs goals into one common view.

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