Implementation of rice farming insurance to support food security and the willingness to pay (case study in Cinta Damai Village, Percut Sei Tuan Subdistrict, Deli Serdang District)

T C Pane¹, Y Supriyono² and D Novita²*

¹Faculty of Agriculture, Universitas Sumatera Utara, Medan, Indonesia.
²Faculty of Agriculture, Universitas Islam Sumatera Utara, Medan, Indonesia.

E-mail: *denovita_02@yahoo.co.id or tasyacpane@usu.ac.id

Abstract. In order to increase food production, the government has made an innovation to protect farmers from the crop failure or damage risk by using the Rice Farming Insurance (AUTP) program. Agricultural insurance has been proven in many countries to successfully protect farmers from various farming risks. The presence of agricultural insurance is expected to play an important role in supporting economic activities in the agricultural sector, but unfortunately, this program has failed to run in Cinta Damai Village, Percut Sei Tuan Subdistrict, Deli Serdang District because of the farmers' objections to paying the insurance premium. The purposes of this study were to see the actual implementation of the AUTP program and calculate the farmers' willingness to pay (WTP) for the AUTP premium. The results of the interview were analysed and explained by the Statistical Description and then the farmers' expected average WTP (EWTP) value was 71,011 IDR/ha/growing season or 142,022 IDR/ha/year.

1. Introduction
As the main food commodity which is the staple food for most of Indonesia's population [1,2], the need for rice in Indonesia is so large and continues to grow every year in line with population growth [3]. In order to increase food production to meet national needs, the government has made an innovation to protect farmers from the crop failure or damage risk by using a policy instrument in the form of the Rice Farming Insurance (AUTP) program [4]. The presence of agricultural insurance generally has an important role in supporting economic activities, especially in the agricultural sector [5]. Insurance provides certainty and protection for business activities from any business risks that may be faced [6]. Agricultural insurance is expected to be able to encourage farmers to prepare their farming plans better [7].

Agricultural insurance is an agreement between a farmer and an insurance company to bind themselves in the farming risks coverage contracts (especially for food crops, horticultural crops, plantation crops, and livestock) [8]. Rice Farming Insurance (AUTP) is a type of agricultural insurance that specializes in rice farming activities [9]. The AUTP program main objective is to provide protection to farmers in the form of working capital assistance in the event of crop damage or failure
risk happen as a result of natural disasters, plant pest organisms’ attacks, infectious plant diseases’ outbreaks, climate changes’ impacts, and other types of risks [10]. By participating in the AUTP program, rice farmers, both landowners and cultivators are expected to be protected from losses due to crop damage or failure [11]. This protection provides them with a capital guarantee to continue their rice farming business in the next planting season [12]. So that farmers can still run their farming business and cultivate rice again even after they experience crop damage or failure [11].

Agricultural insurance is actually not a new term in the agricultural sector development [13]. Many countries, especially developed countries, such as America, Japan, and several European Union countries, have used this policy instrument to maintain their agricultural production and protect their farmers from crop damage or failure risk [14–16]. The average insurance subsidy provided by developed country governments to farmers is 50-60% of the total insurance premium that must be paid by farmers [17]. On the other hand, the world insurance market has also shown very promising developments [18]. Agricultural insurance has been proven in many countries to successfully protect farmers from various farming risks that arise due to changes in ecosystems and disruptions in the ecological balance [19].

The presence of rice farming insurance is expected to play an important role in supporting national food stability and security [20]. But unfortunately, this program has failed to run in many Indonesia regions because of farmers' objections to paying the insurance premium [21]. Many farmers feel that they do not need insurance and also feel burdened by having to pay a premium (although only 20% of the total premium should be), even though they actually have received a premium subsidy of 80% from the government. Much higher than the agricultural insurance premium subsidies provided by the government to farmers in developed countries [14–16].

The purposes of this study were to see the actual implementation of the Rice Farming Insurance (AUTP) program and calculate the farmers’ willingness to pay (WTP) for the Rice Farming Insurance (AUTP) premium. The results of this study are expected to support the realization of national food stability and security by providing suggestions for stakeholders in order to formulate better agricultural development policies.

2. Methods
This research was conducted in Cinta Damai Village, Percut Sei Tuan Subdistrict, Deli Serdang District from August to September 2019. Cinta Damai Village was chosen as the research area purposively because it is one of the areas that participate in the Rice Farming Insurance (AUTP) program in Deli Serdang District, and also has the largest rice farm area, around 1,160 ha. AUTP has been implemented in Percut Sei Tuan Subdistrict since mid-2017. As the largest rice-producing area in North Sumatera Province, farmers in Deli Serdang District are the most interested to participate in the AUTP program [22].

To find out about the real implementation of the AUTP program, interviews were conducted with the Agricultural Extension Officers (PPL). Then interviews were also conducted with lowland rice farmers who had participated or were currently participating in the AUTP program. Samples were taken from the population of 1,500 lowland rice farmers in Cinta Damai Village [22]. The Slovin’s formula was used to calculate the sample size as follows [23,24].

\[
n = \frac{N}{1+N(e^2)} = \frac{1,500}{1+1,500(10\%)^2} = 93.75
\]

Descriptions:
\(n\) = The Sample Size
\(N\) = The Population Size
\(e\) = The Error (\(\alpha = 10\%)\)
From the calculations, as many as 94 rice farmers were then interviewed using a questionnaire as the research respondents. The interviewed respondents were determined by the Non-probability Convenience Sampling Method [25].

To describe the AUTP program implementation from farmers' perspective, the respondents were interviewed about their knowledge of the AUTP program (10 questions), the information related to their farm (8 questions), their participation in the AUTP program (4 questions), and their willingness to pay for the AUTP premium (2 questions). The results of the interview were then analysed and explained by the Statistical Description [26]. The farmers’ willingness to pay (WTP) for the Rice Farming Insurance (AUTP) premium was calculated using the following formula [27].

$$EWTP = \frac{\sum WTP_i X_i}{n}$$  \hspace{1cm} (2)

$$TWTP = EWTP \times P$$  \hspace{1cm} (3)

Descriptions:
EWTP = the expected average willingness to pay
WTP \_i = the willingness to pay value at category \_i
X \_i = the number of respondents who are willing to pay at category \_i
\_i = 1, 2, 3, …, etc; the number of willingness to pay categories
TWTP = the total willingness to pay
P = the number of respondents

3. Results and discussion
The farmers’ participation of in the Rice Farming Insurance (AUTP) program in Cinta Damai Village could be grouped into two categories, namely farmers who were consistently participated in the program and those who were inconsistently participated in the program. The farmers’ consistency was influenced by the stages of the AUTP program preparation and implementation they received. The acceptance level of rice farmers for the AUTP program preparation and implementation really depended on the role of the farmer group administrators and the AUTP program implementation team. Rice farmers’ perceptions of the AUTP program could affect farmers’ participation, where the farmers who were consistently participated in the program and those who were inconsistently participated in the program showed different perceptions [28]. Activities in the AUTP program preparation phases began with area selection (area survey) and then continued with socialization. Meanwhile, the activities at the AUTP program implementation phases consisted of registration, subsidies disbursement, claiming, compensation disbursement, and compensation distribution.

3.1. Organisation of the AUTP program in the Percut Sei Tuan Subdistrict
Percut Sei Tuan Subdistrict Rice Farming Insurance Technical Team:
Director : Percut Sei Tuan Subdistrict Head
Chairman : Department of Agriculture Percut Sei Tuan Subdistrict Regional Technical Implementing Unit (UPTD) Head
Secretary : Plant Pest Organisms Controller - Disease Pest Observer (POPT-PHP) Officers
Members : 1. Villages Heads; 2. Agricultural Extension Officers (PPL)
Percut Sei Tuan Subdistrict Rice Farming Insurance Technical Team had the following duties. 1) Socializing the AUTP program to farmers or farmer groups. 2) Determining potential farmer groups and farmers to participate in the AUTP program. 3) Collecting data and registering potential participants in the AUTP program. 4) Ensuring the area insured by making careful calculations. 5) Collecting the payment proof of insurance premium from farmer groups. 6) The Department of Agriculture Percut Sei Tuan Subdistrict UPTD Head determined the Temporary Participant List as potential recipients of 80% premium subsidies.
3.2. Socialization of the AUTP program in the Percut Sei Tuan Subdistrict

The socialization of the AUTP program in Percut Sei Tuan Subdistrict was carried out by Agricultural Extension Officers (PPL), Department of Agriculture Deli Serdang District, and Jasindo Insurance. The socialization carried out by the Department of Agriculture Deli Serdang District was usually by inviting the heads of farmer groups or farmer group associations to the Department of Agriculture Deli Serdang District Office as the farmer groups’ representatives due to limited time and space. Furthermore, the heads of farmer groups or farmer group associations were tasked with conveying the information they had received to their farmer groups’ members. Agricultural Extension Officers (PPL) would also always convey information about the AUTP program in every activity they did with farmers to continue to instil in farmers about the AUTP program benefits and importance. The AUTP program socialization in Percut Sei Tuan Subdistrict was held at least three times a year.

3.3. Registration process of the AUTP program in the Percut Sei Tuan Subdistrict

Farmers who wished to register to become AUTP participants could report to PPL and then filled in a form containing the candidate name, address, land condition, and planting schedule. PPL would assist farmers in filling in the form and sign it. Then the farmer group head could deliver the forms along with the farmers’ identity cards (KTP) and insurance premium payments to the Department of Agriculture Deli Serdang District. Rice farms that were insured under a farmer group must be in one land stretch. If there were farmers who were not members of a farmer group and want to insure their rice farm which was located on the same land stretch with the farmer group members, the farmers could still register as participants in the AUTP program through the farmer group head. PPL would assist the farmers to measure the farm area to be insured. Measurements were made based on the calculation of the seeds used on the land they were working on.

Rice farmers in Percut Sei Tuan Subdistrict were often late in submitting their identity cards (KTP) as a registration requirement for the AUTP program. Farmers often procrastinated in submitting KTP for various reasons. This could slow down the farmer registration process because the required documents were not yet complete, even though premium payments tended to be carried out on time by farmers. There were slight differences between the implementation of the AUTP premium payment in Percut Sei Tuan Subdistrict and the one stated in the 2018 Rice Farming Insurance Premium Subsidy Guidelines document. In the document, the premium was paid directly by the farmer to the bank account of the insurance company (PT Jasindo). However, in Percut Sei Tuan Subdistrict, the premium was paid by farmers to the Department of Agriculture Deli Serdang District along with the participant registration documents. Then the Department of Agriculture Deli Serdang District deposited the premium to the insurance company. The mechanism was implemented to make it easier for farmers to pay the AUTP premium. Farmers who had registered as participants and paid the premium would receive an insurance policy document within one month after the premium was paid. Because of farmers paid the premium to the Department of Agriculture Deli Serdang District Office and not directly to the insurance company, the issued AUTP policy must be taken at the Department of Agriculture Deli Serdang District Office.

3.4. Claim settlement process of the AUTP program in the Percut Sei Tuan Subdistrict

Payment of claims for crop damage or failure compensation was calculated according to the level of damage incurred. The length of time required by the insurance company to approve a claim in Percut Sei Tuan Subdistrict was 10 days. Compensation money for crop damage suffered by farmers would be transferred directly by the insurance company to the bank account of farmer groups experiencing land damage. Since 2018, only one farmer group had received compensation from the AUTP program in Percut Sei Tuan Subdistrict for land damage caused by drought.

3.5. The implementation of the AUTP program from the farmers' perspective

The results showed that based on their knowledge of the Rice Farming Insurance (AUTP) program, 100% or all respondents (lowland rice farmers) in this study (94 people) had participated in the AUTP
program, had known the AUTP program since 2018, had known the function of the AUTP program, and also had known the procedures, the premium amount to be paid, and the claims amount to be received in the AUTP program. Based on information related to farming, all respondents in this study planted rice 2 times a year. Based on their participation in the AUTP program, all respondents in this study had submitted insurance policy claims at least 1 to 2 times, were no longer the AUTP program participant, but still wanted to participate in the AUTP program if available in the future. Table 1a and 1b show the other descriptions of the farmers’ knowledge of the Rice Farming Insurance (AUTP) program, information related to farmers’ farm, and farmers’ participation in the AUTP program.

Table 1a. Descriptions of the farmers’ knowledge of the Rice Farming Insurance (AUTP) program, information related to farmers’ farm, and farmers’ participation in the AUTP program.

| Farmers' knowledge of the Rice Farming Insurance (AUTP) program. | Subsidy | Non-Subsidy | Total |
|---------------------------------------------------------------|---------|-------------|-------|
| The premium payment scheme that had been participated          |         |             |       |
| Respondent                                                    | 48.00   | 46.00       | 94.00 |
| %                                                             | 51.06   | 48.94       | 100.00|
| Had been informed about the AUTP program by                    |         |             |       |
| Extension Officers                                            | 45.00   | 35.00       | 94.00 |
| %                                                             | 47.87   | 37.23       | 100.00|
| Jasindo Insurance Agents                                      |         |             |       |
| %                                                             |         |             |       |
| Friends                                                       | 14.00   |             | 94.00 |
| %                                                             | 14.89   |             | 100.00|
| Had been a consistent or an inconsistent AUTP participant because of |         |             |       |
| Feeling more secure in farming                                 | 36.00   |             | 94.00 |
| %                                                             | 38.30   |             | 100.00|
| Having experienced Crop Failure                                | 2.00    |             | 9.00  |
| %                                                             | 2.13    |             | 9.57  |
| Having Self Awareness of the Program Benefits                  | 9.00    |             | 47.00 |
| %                                                             | 9.57    |             | 50.00 |
| Neighbourhood Farmers Not Participating in the Program         |         |             |       |
| %                                                             |         |             |       |
| Not Participating in the Program                               | 47.00   |             | 94.00 |
| %                                                             | 50.00   |             | 100.00|
| Had been given extension or socialization regarding the AUTP program information and procedures by agricultural extension officers | Yes     | No          |       |
| Respondent                                                    | 44.00   | 50.00       | 94.00 |
| %                                                             | 46.81   | 53.19       | 100.00|

Information related to farmers’ farm.

| Had been doing farming for (Year) | 10 to 15 | 16 to 20 | 21 to 25 | 26 to 30 | Total |
|----------------------------------|----------|----------|----------|----------|-------|
| Respondent                       | 47.00    | 35.00    | 6.00     | 6.00     | 94.00 |
| %                                | 50.00    | 37.23    | 6.38     | 6.38     | 100.00|
| Farm land Size (Ha)              | 0.00 to 1.00 | 1.10 to 2.00 | 2.10 to 3.00 | Total |
| Respondent                       | 45.00    | 42.00    | 7.00     |         | 94.00 |
| %                                | 47.87    | 44.68    | 7.45     |         | 100.00|
Table 1b. Descriptions of the farmers' knowledge of the Rice Farming Insurance (AUTP) program, information related to farmers’ farm, and farmers' participation in the AUTP program (Continue).

| Information related to farmers’ farm. | Owned Farm Land | Rented Farm Land | Total |
|---------------------------------------|-----------------|------------------|-------|
| **Farm land ownership status**        | Respondent      | %                |       |
| Owned Farm Land                       | 88.00           | 93.62            | 94.00 |
| Rented Farm Land                     | 6.00            | 6.38             |       |

| **Production amount per growing season (Kg)** | Respondent | % |       |       |
|-----------------------------------------------|------------|---|-------|-------|
| < 5,000                                       | 9.00       | 9.57|       |       |
| 5,000 to 5,500                                | 7.00       | 7.45|       |       |
| 5,501 to 6,000                                | 76.00      | 80.85|       |       |
| > 6,000                                       | 2.00       | 2.13|       |       |
| **Total**                                     | 94.00      | 100.00|      |       |

| **Farm income per growing season (Thousand IDR)** | Respondent | % |       |       |
|-------------------------------------------------|------------|---|-------|-------|
| < 17,500                                       | 9.00       | 9.57|       |       |
| 17,500 to 19,250                               | 7.00       | 7.45|       |       |
| 19,251 to 21,000                               | 76.00      | 80.85|       |       |
| > 21,000                                       | 2.00       | 2.13|       |       |
| **Total**                                      | 94.00      | 100.00|      |       |

| **Frequency of experiencing crop failure**     | Respondent | % |       |       |
| Rarely (1-2 Times)                            | 23.00      | 24.47|       |       |
| Never (0 Time)                                | 71.00      | 75.53|       |       |
| **Total**                                     | 94.00      | 100.00|      |       |

| **Had been experiencing Crop Damage or Disaster** | Respondent | % |       |       |
| Yes                                            | 25.00      | 26.60|       |       |
| No                                             | 69.00      | 73.40|       |       |
| **Total**                                      | 94.00      | 100.00|      |       |

| **Farmers' participation in the AUTP program.** | Respondent | % |       |       |
| 1-2                                            | 80.00      | 85.11|       |       |
| < 1                                            | 14.00      | 14.89|       |       |
| **Total**                                      | 94.00      | 100.00|      |       |

3.6. The farmers’ willingness to pay (WTP) for the Rice Farming Insurance (AUTP) premium

Table 2. The farmers’ willingness to pay (WTP) for the Rice Farming Insurance (AUTP) premium.

| No | Willingness | Respondent (Person) | Percentage (%) |
|----|-------------|---------------------|----------------|
| 1  | Willing     | 45                  | 47.87          |
| 2  | Unwilling   | 49                  | 52.13          |
|    | Total       | 94                  | 100.00         |

Table 2 shows the farmers’ willingness to pay (WTP) for the Rice Farming Insurance (AUTP) premium. As many as 47.87% of lowland rice farmers from 94 respondents were willing to pay the AUTP premium, while the remaining 52.13% were unwilling. Since the beginning, the farmers were willing to participate in the AUTP program as a condition for getting government assistance. Even so, some respondents stated that they were willing to pay the AUTP premium because they had experienced or witnessed the program benefits first-hand. However, there were still more respondents who stated that they were unwilling to pay the AUTP premium. This was because they felt that the AUTP program should be a form of assistance from the government, so they should be exempted from
paying the premium. Actually, they were uninterested to participate in the AUTP program, especially if they had to pay a certain amount of premium to participate. This lack of interest was due to their low awareness of the AUTP program benefits. Figure 1 shows the trend of farmers' Willingness to Pay (WTP) for the Rice Farming Insurance (AUTP) premium, where the higher the value of the premium that must be paid by lowland rice farmers, the less the number of farmers who were willing to pay it.

Table 3. The calculation of the farmers’ expected average WTP (EWTP) and total WTP (TWTP) values for the Rice Farming Insurance (AUTP) premium.

| No | WTP Value (IDR/ha/growing season) | Frequency (Person) | Relative Frequency | Expected Average WTP (IDR/ha/growing season) | Total WTP (IDR/ha/growing season) |
|----|-----------------------------------|--------------------|-------------------|---------------------------------------------|----------------------------------|
| 1  | 175,000                           | 14                 | 0.15              | 26,064                                      | 2,450,000                       |
| 2  | 162,500                           | 3                  | 0.03              | 5,186                                       | 487,500                         |
| 3  | 150,000                           | 10                 | 0.11              | 15,957                                      | 1,500,000                       |
| 4  | 137,500                           | 3                  | 0.03              | 4,388                                       | 412,500                         |
| 5  | 125,000                           | 11                 | 0.12              | 14,628                                      | 1,375,000                       |
| 6  | 112,500                           | 4                  | 0.04              | 4,787                                       | 450,000                         |
| 7  | 0                                 | 49                 | 0.52              | 0                                           | 0                               |
|    | Total                             | 94                 | 1.00              | 71,011                                      | 6,675,000                       |

Figure 1. The trend of farmers' Willingness to Pay (WTP) for the Rice Farming Insurance (AUTP) premium.

Table 3 shows that the farmers' expected average WTP (EWTP) value was 71,011 IDR/ha/growing season or 142,022 IDR/ha/year. The farmers' WTP value for the AUTP premium was also related to the farmers’ enthusiasm and motivation to manage their farming risks. One of the AUTP program success indicators was that the farmers support the AUTP program implementation by willing to pay the insurance premium. When a farmer was willing to pay the insurance premium, it meant that he had tied himself up in the farming risks coverage contract, with Jasindo insurance as the implementing
insurance company. Thus, various risks that might be faced by farmers, such as production risks (fluctuations in production) due to various unpredictable factors such as climate change, extreme weather, floods, drought, and attacks by plant pest organisms (OPT) could be minimized, so that the sustainability of farming could also be guaranteed. In addition, when farmers paid the premium, the AUTP program could continue and be declared successful, so that the AUTP program objectives as a guarantor from the risk of crop damage or failure could be achieved.

4. Conclusions and suggestions
The results showed that the implementation of the AUTP program in Cinta Damai Village had gone well and smoothly, from the socialization to the claim settlement processes were almost completely according to the AUTP implementation guideline. The farmers' expected average WTP (EWTP) value was 71,011 IDR/ha/growing season or 142,022 IDR/ha/year. In order to be able to increase the enthusiasm and motivation of farmers in managing their farming risks, farmers still really need preparations in the form of socialization and guidance that is deeper, better, and more frequent.

References
[1] Havemann T and Muccione V 2011 Mechanisms for agricultural climate change mitigation incentives for smallholders CCAFS Report no 6
[2] Supriana T and Pane T C 2018 The influences of consumer characteristics on the amount of rice consumption IOP Conf Ser Earth Environ Sci 122(1) 012022
[3] Fustos K 2011 Rising Global Food Prices Threaten to Increase Poverty Popul Ref Bur
[4] Pasaribu S M and Sudiyanto A 2016 Agricultural risk management: Lesson learned from the application of rice crop insurance in Indonesia Climate Change Policies and Challenges in Indonesia (Tokyo, Japan: Springer)
[5] Budiman I, Takama T, Pratiwi L and Soeprastowo E 2016 Role of microfinance to support agricultural climate change adaptations in Indonesia: Encouraging private sector participation in climate finance Futur Food J Food, Agric Soc 4(3) pp 55-68
[6] Brånstrand F 2014 Factors affecting crop insurance decision - A survey among Swedish farmers (Uppsala, Sweden: SLU, Dept of Economics)
[7] Elerts P 2019 Article 8 1-1-2019 Crop Insurance Reform in the Face of Climate Change 25 Hastings Envt’l L J
[8] Vedenov D V, Miranda M J, Dismukes R and Glauber J W 2004 Economic analysis of the standard reinsurance agreement Agric Financ Rev
[9] Ngoc Que Anh N, Thanh Binh P and Dang Thuy T 2019 Willingness to pay for agricultural flood insurance in the Mekong River Delta Environ Hazards 18(3) pp 212-27
[10] Dewi N, Kusnandar and Rahayu E S 2018 Risk mitigation of climate change impacts on rice farming through crop insurance: An analysis of farmer’s willingness to participate (a case study in Karawang Regency, Indonesia) IOP Conf Ser Earth Environ Sci 200(1) 012059
[11] Nakatsuji S 2004 Changes in slash-and-burn agriculture after the introduction of cash crops in the hilly areas of Laos: A case study of Number 10 Village, Xiengkeun District, Luang Prabang Province Japanese J Hum Geogr 56(5) pp 449-69
[12] Shields D A 2011 A whole-farm crop disaster program: Supplemental Revenue Assistance Payments (SURE) Agriculture Disaster and Crop Insurance: Background and Issues
[13] Nunoo J and Acheampong B N 2014 Protecting financial investment: Agriculture insurance in Ghana Agric Financ Rev 74(2) pp 236-47
[14] Liesivaaara P and Myyriä S 2014 Willingness to pay for agricultural crop insurance in the northern EU Agric Financ Rev 74(4) pp 539-54
[15] Carriquiry M A and Osgood D E 2006 Index Insurance, Production Practices, and Probabilistic Climate Forecasts
[16] Smith V and Watts M 2009 Index Based Agricultural Insurance in Developing Countries: Feasibility, Scalability and Sustainability Gates Found
[17] Sandmark T, Debar J-C and Tatin-Jaleran C 2013 The emergence and development of agriculture microinsurance Microinsurance Netw
[18] Dick W J A and Wang W 2010 Government interventions in agricultural insurance Agriculture and Agricultural Science Procedia 1 pp 4-12
[19] World Bank 2011 Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions World Bank
[20] Li C S, Liu C C and Zhang Y 2017 Determinants of agricultural household demand for insurance in China from 2004 to 2007 China Agric Econ Rev 9(4) pp 660-7
[21] Zeng J 2017 A Big-data-based Research on Rural Endowment Insurance and Rural Family Financial condition Rev la Fac Ing
[22] Badan Pusat Statistik Provinsi Sumatera Utara [BPS-Statistics of Sumatera Utara Province] 2019 Provinsi Sumatera Utara dalam Angka 2019 [Sumatera Utara Province in Figures 2019] (Medan, Indonesia: Badan Pusat Statistik Provinsi Sumatera Utara [BPS-Statistics of Sumatera Utara Province])
[23] Ryan T P 2013 Sample Size Determination and Power (Hoboken, New Jersey: John Wiley & Sons, Inc)
[24] Ellen S 2018 Slovin’s Formula Sampling Techniques Sciencing
[25] Marshall M N 1996 Sampling for qualitative research Fam Pract 13(6) pp 522-6
[26] Press W H, Teukolsky S A, Vetterling W T and Flannery B P 2007 Chapter 14. Statistical Description of Data Numerical Recipes in C: The Art of Scientific Computing
[27] Syaukat Y and Maryani A 2020 Willingness to Pay and Consumption Characteristics of Drinking Water to the Households in Katulampa Village, City of Bogor IOP Conf Ser Earth Environ Sci 477(1) 012027
[28] Pane T C, Supriyono Y and Novita D 2020 Supporting food security with rice farming insurance: the farmers’ perceptions (case study in Cinta Damai Village, Percut Sei Tuan Subdistrict, Deli Serdang District) The 4th International Conference on Agriculture, Environment, and Food Security (AEFS) pp 1-8