

The Millennial Farmers' Interest in Succeeding the Family Agriculture for Hydroponic Application in Garut District, West Java Indonesia

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Abstract The interest of farmers' daughters and sons to become farmers has currently been very low, although productive age population is more dominant (62%) than other age groups. Low young villagers to choose the agricultural world is caused by many factors, negative stigma of farmers due to dirty, low income, and so on. A study regarding the millennials' to pursue parents' careers as farmers was performed in several villages around Tarogong Kidul District, Garut Regency. This survey study through interviews was conducted on April – June, 2021 with the aims of describing the youngsters' interest level to continue the family agriculture activity, the influenced factors, and finding strategies to increase the youngsters' interest level to continue the family agriculture activity. Data were collected from 54 respondents of 105 millennial farmers based on the Slovin formula with 10 percent error. Data collection was performed directly using closed questionnaires which have been assessed its validity and reliability. Data were analyzed descriptively to explain the variance of each variable, while double linear regression analysis was used to analyze the influenced factors. The study results showed that all independent variables influenced significantly the millennials' interest level with the R-square value of 0.580. The influence coefficients of each variable were formulated in an equation of $Y = 82.385 + (0.898) X_1 + (0.448) X_2 + (0.269) X_3$. Therefore, increasing the youngsters' interest in agriculture needs to pay attention to the youngsters' individual characteristics

(X_1), external factors (X_2), and social roles (X_3).

Keywords Hydroponics, Interest, Millennial Farmers, Family Agriculture Successor

1. Introduction

The government's goal in advancing Indonesian agriculture is inseparable from the agricultural development spirit and technological progress by increasing the mechanization and research through the agricultural mechanization development and application before and after harvest, followed by accelerating the use of technological innovation. Human resources are one of the keys to agricultural development implementation, besides natural resources and technology [18]. The government's goal follows the Millennial Farmer 4.0 program established by the West Java Governor which requires young generations who are excited to pursue an agricultural world in terms of optimizing the agriculture land and developing more agricultural advances in the Covid-19 pandemic era. Agricultural development is insufficient if only describing innovation, facilities and infrastructure, as the main component to improve is Human Resources (HR), which can implement innovations, facilities, and infrastructure properly and correctly,

especially during this pandemic era, where everything has been done digitally. Less supportive human resources cause the agricultural development to be carried out improperly. Therefore, an increased number of young age workers in the agricultural fields is required to enhance sustainable agricultural production.

The real condition in the field presents that only about 8 percent of the Indonesian farmers (33.4 people) who are millennial farmers that can absorb technology and innovation well, while the rest more than 90 percent of the Indonesian farmers are included in colonial farmers or old farmers [2]. The low young generations' in the agriculture business is followed by the fact that the young farmer proportion in Indonesia is very low. According to [7], the low youngsters' in the agricultural field is due to low youngsters' in agriculture development. The low interest of young generations in agricultural activities is caused by the less knowledge of technical and experience of agricultural activities [5]. Decreased millennial generation's interest in the agricultural sector is also caused by the tendency of choosing another sector either in the village or around the town region [17]. Anwarudin [1] stated that most young generations perceived that the agricultural business is less profitable. Facing the demographic bonus, as productive workers between 15 - 64 years old are about more than 62 percent of the total population in Indonesia, demands our roles, especially the government to take this advantage.

The agricultural relay is then fully held by the millennial generations who will determine the agriculture success in the future because the millennial generation is easier to adopt the latest technology to advance the agricultural sector compares to the colonial farmers, while the decreased number of workers in agriculture is due to lack of interest from the youngsters to enter the agriculture world.

The fact in the field presents that the millennials prefer choosing jobs outside of agriculture. Therefore, a further study was required regarding the millennial farmers' interest as family agriculture successors by applying hydroponics in the pandemic era, which can become a reference to enhance the millennial generation's interest, especially in Tarogong Kidul District, and mainly in Garut Regency, West Java.

Garut Regency was selected as the study location as related to the program established by the West Java Governor regarding the opening of job vacancies for millennial farmers to improve the available land is included in Garut Regency. This study specifically aimed to: (1) describe the millennial farmers' interest as family agricultural successors, (2) analyze the factors that influenced the interest, and (3) find a strategy to enhance the interest.

2. Literature Review

Interest is a person's tendency to respond in a certain way. Interest can also be interpreted as a condition when

someone views the characteristics or temporary meaning of a situation associated with a person's desires or needs. A person's interest in an object will be more visible if the object is on target and related to the desires and needs.

Interest is related to the feeling of liking or pleasure from someone towards an object. Stated that interest was a sense of preference and attachment to a thing or activity, without anyone telling it. Interest is basically the acceptance of a relationship between oneself and something outside oneself. The stronger or closer the relationship, the greater the interest. Interest is an intensively directed moment and tendency toward an object considered important.

Slightly different from interest, motivation, which originated from the motive or need, is the main impetus for a person to act or an internal force that drives someone to do something [15]. Motivation is an impulse that arises from a person because of the priority needs. In the working environment, motivators are the actual work itself, while achievement, growth, responsibility, advancement, and recognition are included in the extrinsic motivators. Motivation is closely related to needs; various theories of motivation are usually based on needs.

Thinking Framework

Interest is influenced by many factors, either from within a person or from outside the person. Effendy, Maryani, and Yulia [5] reported that the youngster's interest in agriculture was influenced by many factors, such as the desire to receive awards, desire to have an achievement, life necessities, extension activities, resource availability, and government program support. Similarly [10] on farmers' interest in *jajar legowo* system application concluded that interest was determined by the farmer characteristics, including age, education level, land ownership area, and farming experience, while external factors were available facilities and infrastructure support and easier access to gain information and technology sources. Based on the above description and previous study results, several independent variables (X) were determined which were thought to have the dependent variable of interest (Y). Several variables were thought to influence the millennial farmers' interest in continuing their family business in agriculture, namely: Individual characteristics (X₁), namely age, formal education, agriculture business land, experience, and non-formal education; external factors (X₂) contained the extension officer roles, extension activities, agricultural transmission by families, and government support; social roles (X₃) contained a sense of responsibility, fulfilling the livelihood, and government program implementation, as presented in Figure 1.

3. Research Methods

This study used a quantitative approach supported by the qualitative data. This study was performed for three

months (April – June, 2021). The analysis unit was millennial farmers in Taragong Kidul District with the parent backgrounds were agriculture business actors from three villages, namely Cibunar, Sukabakti, and Sukakarya Villages. The total population was 104 people from six farmer groups. Samples were determined using the Slovin formula, which was found that the total sample used was 54 people.

Data collection was performed through direct interviews using closed questionnaires with the available scores from 1 to 4. Before using the data-collecting tool, questionnaires were assessed first. The questionnaire reliability test results obtained the *Cronbach alfa* at 0.942, which indicated that the questionnaire was included in a reliable category that could be used for the data-collecting tool. The collected data contained primary and secondary data.

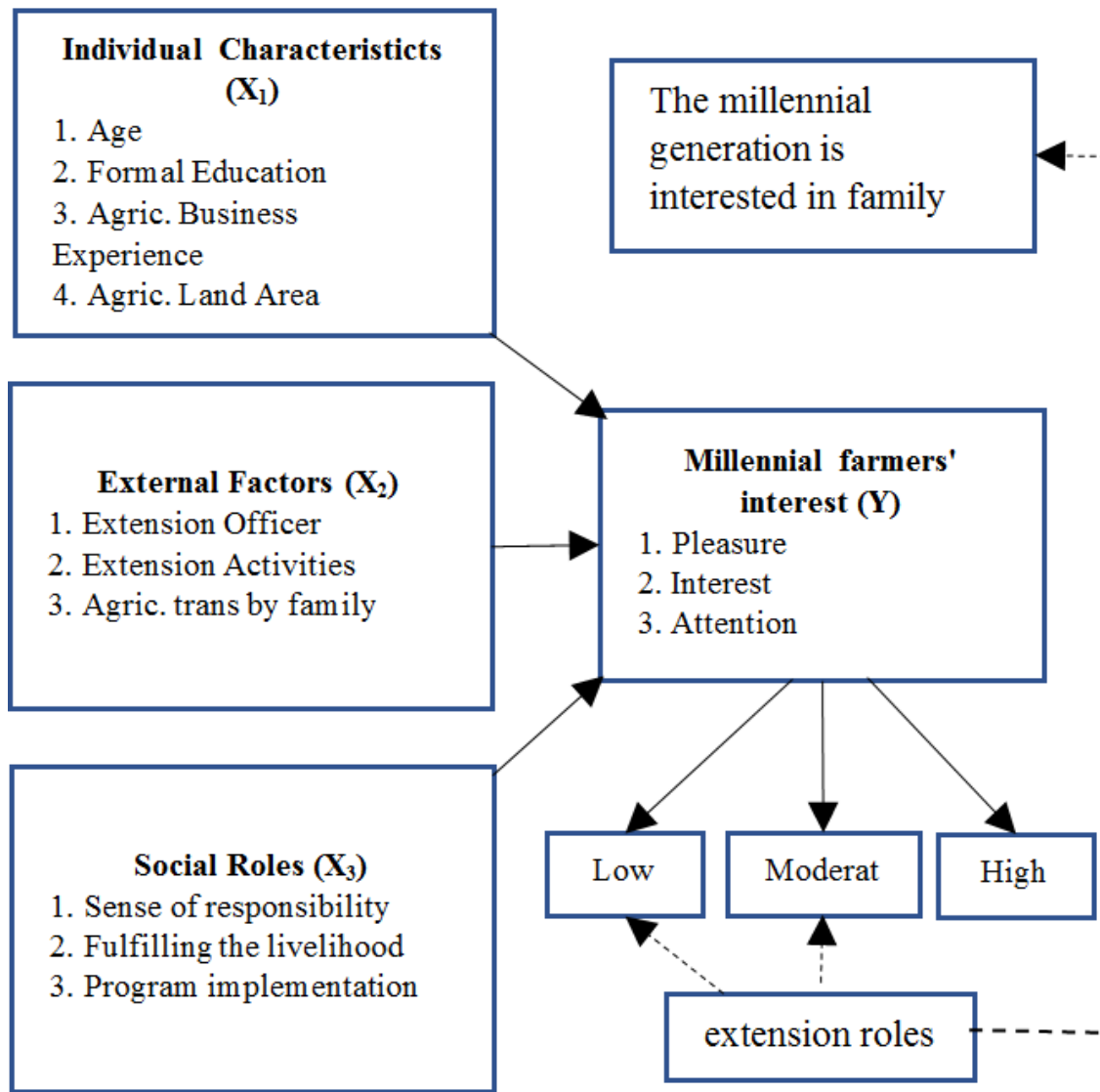


Figure 1. Thinking framework on millennial farmers' interest in family agricultural successors by applying hydroponics on the pandemic era in Taragong Kidul District

Data were analyzed with descriptive statistics and double linear regression assisted with *Microsoft Excel* and *SPSS*. The double linear regression analysis was used to measure the factors that influenced millennial farmers' interest as family agriculture business successors with the equation: $\hat{Y} = \alpha + b_1 x_1 + b_2 x_2 + b_3 x_3 + e$. Meanwhile, a strategy to increase the millennial farmers' interest as family agricultural business successors was formulated from the descriptive and double linear regression analysis results.

4. Results and Discussions

4.1. Variable Descriptions

The descriptive analysis results on the farmer characteristics obtained that most respondents (70%) were in an old category at approximately ≥ 28 years old. Furthermore, the formal education level obtained that 43 percent of respondents were in a high school category. The agriculture business experience in a long category (13-18 years) was at 30 percent. The land area for agricultural business for most respondents (74%) was a very narrow land owner (10 – 5008 m²). Based on the non-formal education, most respondents (33%) never attended any non-formal education or training. Details about the characteristics' variance are presented in Figure 2.

Figure 2 explains that the major respondents were in an

old category at 70.4 percent with the age range of 28 years old. This means that the older agriculture actors, the harder millennials' interest as family agriculture business successors to measure. Therefore, this level was only related to relatively young respondents. Effendy and Apriani [12] also concluded that the respondents' age influenced the farmer regeneration as older farmer age resulted in the physical capability in carrying the agriculture business on the red chili farmer community in Banyuresmi, Garut, thereby when the young age was studied deeply, participation and perception on happiness and welfare definitions were different.

This condition also followed [11], who stated that age closely influenced the person's performance and productivity, whereas the younger age resulted in an easier way for somebody to accept and adopt the latest information and innovation. The formal education indicator in respondents also influenced the millennial farmers' interest as family agricultural business successors. In this study, respondents had quite various formal education period levels dominated by a quite good educational level, namely high school, at 42.6 percent of 54 people. Education in high school level closely influenced the millennial farmers' interest as the family agricultural business successors. Education determines the person's capability because knowledge and skills will increase, including behavioral formation, followed by affecting the thinking way and decision-making on a technology.

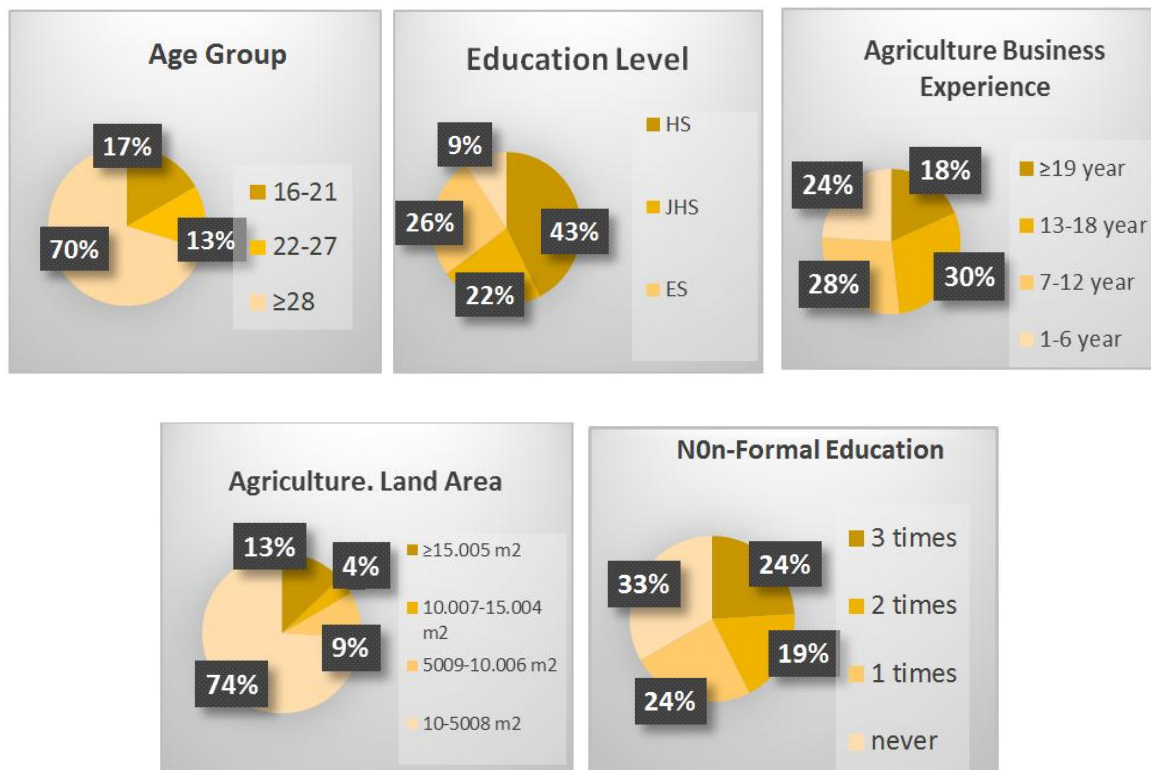


Figure 2. Respondent characters' variance

This condition was similar [13], who concluded that the educational level influenced the farmer's motivation to improve the group function. This indicator followed [13] that education had a significant effect on farmers' interest in agricultural business, as a good education could improve easier idea pattern formation in farmers, which could increase the agricultural business responsibility. According to [6], most farmer respondents on educational level had good reading and writing capabilities, which allowed the farmers to access information from mass media following the requirements. Furthermore, [8] reported that the educational level affected the information obtained during the extension program.

The agricultural business experience owned by respondents in Tarogong Kidul District can be stated as a quite-long period. The average of respondents who had the agricultural business experience of 13-18 years was 29.6 percent of the total respondents 54 people. They have been carrying out an agricultural business since a young age, but many of them have been carrying out the business since a very young age, although only assisting the parents in the agricultural business activity, as their knowledge could be easily formed and understand the information and innovation in agriculture field.

This condition was similar [7] on farmers who had in carrying the agriculture activity that could produce wider knowledge than the beginner farmers who had no experiences. According to [16], experiences influence the farmers' interest in agricultural business as the more experienced obtained, the easier is the way to understand the steps that should be taken in strengthening the agriculture business.

Effendy [10] found that the lack of youngster's participation was caused by a lack of experience and technical knowledge in agriculture. Experience will be very influential and necessary in carrying out agriculture as long experience could enable someone to receive information and innovation in agriculture activities, and further increases a person's interest in continuing the family's agriculture, which is similar to [6], who stated that experience affected the decision-making, especially the innovation acceptance for the efforts.

The land area owned by respondents in Tarogong Kidul District was relatively in a large category around 15,000 - 25,000 m. However, there were also respondents who only had a narrow land area less than 10,000 m and some of whom only had a 50-m land area ownership. Similarly [5] mentioned that the agricultural land area influenced the farmer participation to improve the group capabilities. When the farmer ability increases, the farmer's interest will also increase.

Non-formal education joined by farmers will determine the extent of farmers' interest in continuing the family agriculture business. Unfortunately, there was quite a number of millennial farmers at the study location, who

still rarely participated in non-formal education. According to the interview results, the pandemic era caused a rarely-held extension program by the extension officers, specifically the agriculture field school, which can emphasize that many young farmers rarely join the non-formal education. In Effendy et al [5], the cosmopolitan level affected the youngsters' capacity development in the chili agriculture business community in Garut Regency. Similarly [5] concluded that a person's cosmopolitan level affected the youngsters' interest in agriculture in a rural area in Sindangkasih Ciamis District.

The external factors observed in this study contained extension officers' roles, extension activities, and agriculture transmission by partners, and governmental support. The external factor variance is presented in Figure 3.

The analysis results showed that the extension officers' role was in a moderate category at 44.4 percent. This finding followed [8], who concluded that the agricultural extension officer roles affect the farmer spirit in the balanced fertilization implementation of rice fields in Cikoneng District, Ciamis Regency. Furthermore, the analysis results showed that the counseling activities were included in a moderate category at 63 percent.

The data analysis results showed that the agricultural transmission by parents provided a high influence at 63 percent. The existence of respondents' behavior who participated in assisting the family agriculture activities, contributes to the interests and mindset of the young generation on agriculture. By carrying out the agricultural transmission, there will be a basis for the next generation to involve in family agriculture business along with the counseling activities carried out by the agricultural extension officers. This condition followed [15] who stated that animal culture interests in youngsters was influenced by the family environment such as the parents' education way, home atmosphere, socio-economic status, and parents' working type. Rusadi [15] also argued that parents were parties fully responsible for the process of determining the child's personality, namely interest.

The analysis results stated that the government support was in a moderate category at 46.2 percent. This condition was similar [10], who concluded that government policy support could determine the youngster's participation in agricultural development. Panurat [16] stated that government support significantly influenced the farmers' interest, so the existence of government assistance and support could increase the millennial farmers' interest as family agricultural successors.

Social roles taken in this study include sense of responsibility, fulfilling the livelihood, and program implementation. The social role diagram can be seen in Figure 4.

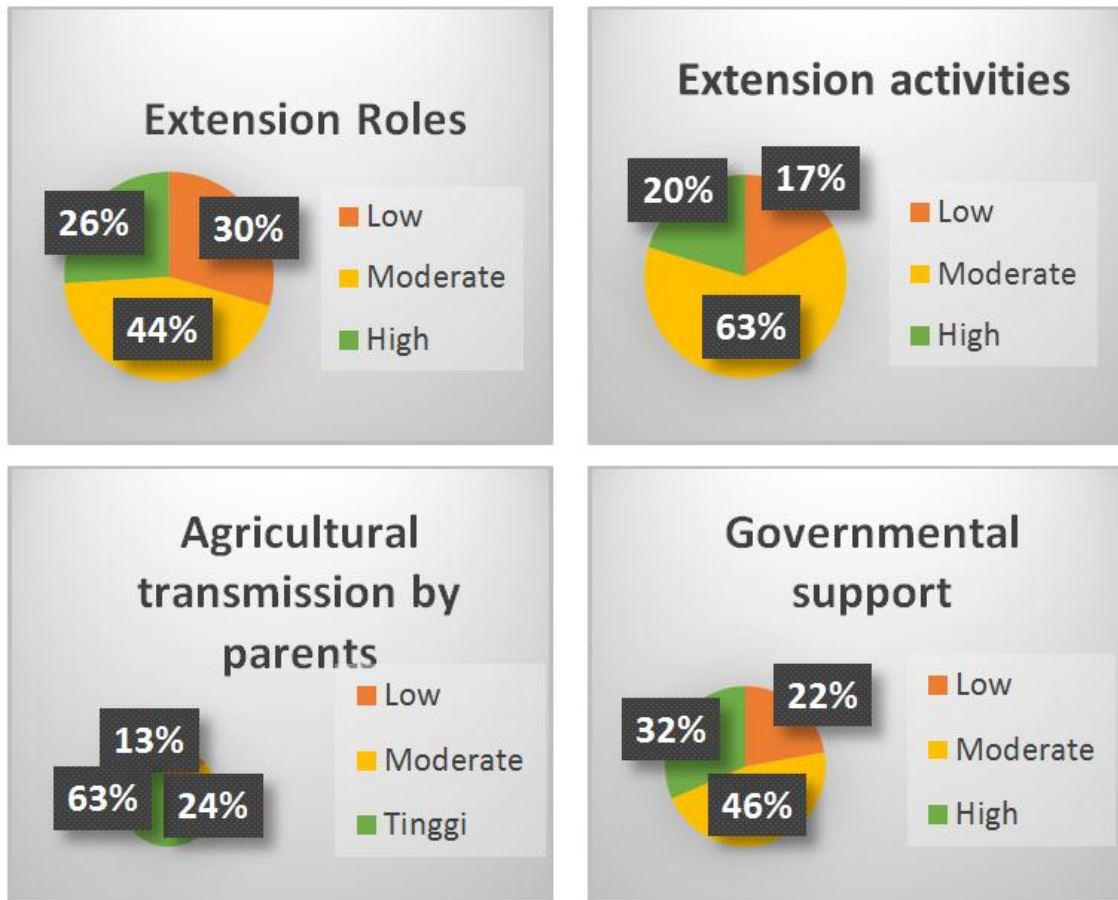


Figure 3. External factor variance

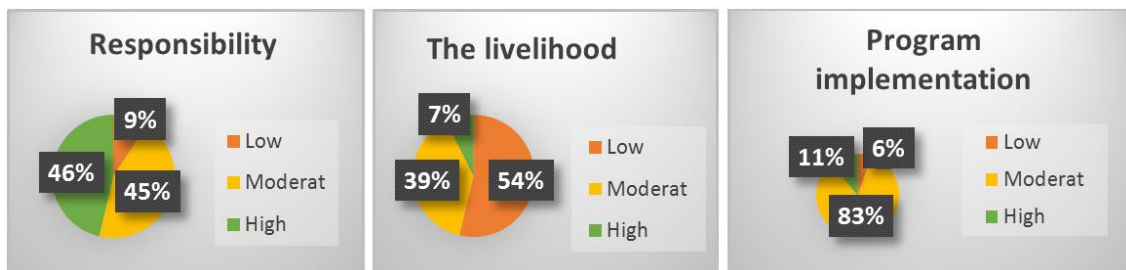


Figure 4. Social role variance

The descriptive analysis results also showed that responsibility of the respondents was included in a high category at 46.3 percent of the total respondents at 54 people. This condition emphasizes that the sense of responsibility extremely influences the millennial farmers' interest as family agricultural business successors. This condition was similar [2], that the motivation and sense of responsibility level significantly influenced the interest to succeed in the family agricultural business, which means that the higher sense of responsibility, the higher youngsters' interest in family agriculture.

Based on the descriptive analysis, fulfilling the livelihood was in a low category at 53.7 percent of 54 people. This was because the young respondents perceived

that they were still irresponsible for fulfilling their livelihood as most of them have just started the business, but still did not gain high profit. Similarly [12] stated that life demands had no effect on the youngsters motives for agriculture as youngster were still parental-dependent. However, they perceived responsible for fulfilling the livelihood both their own and family livelihoods on farmers who are in a productive age. This condition was similar [15], who stated that the main reason for a person to work was the income gain and livelihood fulfillment, whereas the higher benefits obtained to require the livelihood, the higher interest, productivity, and working spirit gained as expected.

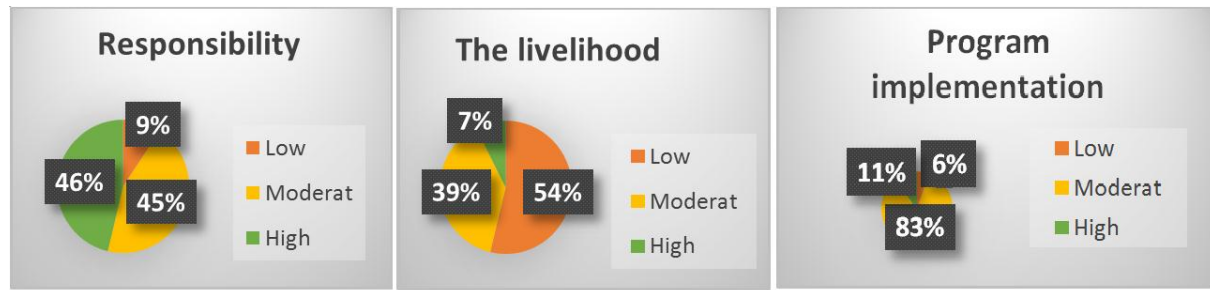


Figure 5. Interest variance

According to the descriptive analysis results, the program implementation was included in a moderate category with 83.3 percent of the total respondents of 54 people. Therefore, it can be stated that the program implementation surely influences the millennial farmers' interest as family agricultural business successors. These results were supported by the previous study from [15], who stated that implementing the program could build a wider relationship for farmers and gain respect from the community. This respect will form the interest and characteristics of the cattle farmers in cattle farming, thereby the farmers' interest could increase continuously.

From the **interest** variable, there were three indicators, namely pleasure, interest, and attention. The diagram of millennial farmers' interest variance can be seen in Figure 5.

Figure 5 explains that pleasure was in a moderate category, interest was in a moderate category, and attention was in a high category. Therefore, the individual characteristics, external factors, and social roles influence the millennial farmers' interest as family agricultural business successors. Similarly [5], [12] reported that the individual characteristics influenced significantly members' interest and motivation to increase the group roles.

Furthermore, [6], [5], [8], [9] concluded that the external factors influenced the interest and participation of the youngsters in agricultural activity. Rusadi [15] stated that the social roles influenced the youngsters' interest in cattle livestock culture.

4.2. Factors that Influence the Millennial Farmers' Interest

Based on the double linear regression analysis, several factors influenced the millennial farmers' interest as family agricultural business successors. The analysis results mentioned are presented in Table 1.

The analysis results (Table 1) show that the characteristic variable (X_1) could significantly influence ($p < 0.1$) the millennial farmers as family agricultural business successors, while external factors (X_2) and social roles (X_3) could significantly influence ($p < 0.01$) the millennial farmers' interest mentioned above, which obtained a regression equation: $Y = 82.385 + (0.898) X_1 +$

$(0.448) X_2 + (0.269) X_3 + e$. Furthermore, this equation can be interpreted, whereas the characteristic factors (X_1), external factors (X_2), and social roles (X_3) have a zero value, then the farmers' interest as family agricultural business successors is 82.385.

Table 1. Factors that influence the millennial farmers' interest

No	Variable	Coefficient	Sig.	Note
	R-square	0.580	-	-
	Constanta	82.385	-	-
1	Characteristics	0.898	0.100	Significant
2	External Factors	0.448	0.000	Significant
3	Social Roles	0.269	0.000	Significant

The b_1 coefficient value on X_1 variable was 0.898, which explains the correlation of respondent characteristics (X_1) and millennial farmers' interest as family agricultural business successors (Y). This means that if the external factors (X_2) and social roles (X_3) remain constant, there will be an increased respondent characteristic value (X_1) at one unit that will elevate the millennial farmers' interest as family agricultural successors (Y) by 0.898 times. The b_2 coefficient was 0.448, which means that there is a correlation between the external factors (X_2) and millennial farmers' interest as family agricultural business successors (Y). This means that if the respondent characteristics (X_1) and social roles (X_3) remain constant, there will be an increased external factors (X_2) at one unit that will elevate the millennial farmers' interest as family agricultural successors (Y) by 0.448 times.

The b_3 coefficient was 0.269, which means that there is a correlation between the social roles (X_3) and millennial farmers' interest as family agricultural business successors (Y). This means that if the respondent characteristics (X_1) and external factors (X_2) remain constant, there will be increased social roles (X_2) at one unit that will elevate the millennial farmers' interest as family agricultural successors (Y) by 0.269 times.

Table 1 above also explains that the independent variable contributions in the study based on the R-square is 0.580, which indicates that all independent variables to influence the study results are 58 percent, while 42 percent are influenced by other factors studied.

4.3. Millennial Farmers' Interest Improvement Model

Based on the analysis results, the millennial farmers' interest as family agricultural business successors is unable to reach a higher level. Therefore, a proper model and strategy to improve the millennial farmers' interest as family agricultural business successors is necessary for increasing the agricultural business relay. The model and strategical plan for the extension program are presented in Figure 6.

Based on Figure 6, a strategy can be designed to improve the millennial farmers' interest through extension activity, namely by optimizing the respondent potentials that reflect on the productive age, available formal education level

(high school), appropriate agriculture business experience (13-18 years), and quite a wide land ownership, followed by the interest potential owned by the millennial farmers who are pleased, attentive, and interested in agriculture can become a momentum for more improvement in their interests.

Moreover, the millennial farmers' capacity should be improved gradually through training or thematic technical counseling based on the requirements. Also, the extension program and extension officer roles should also be increased and the parental behaviors who provide pieces of advice and motives for pursuing the parents' job as farmers should be applied routine.

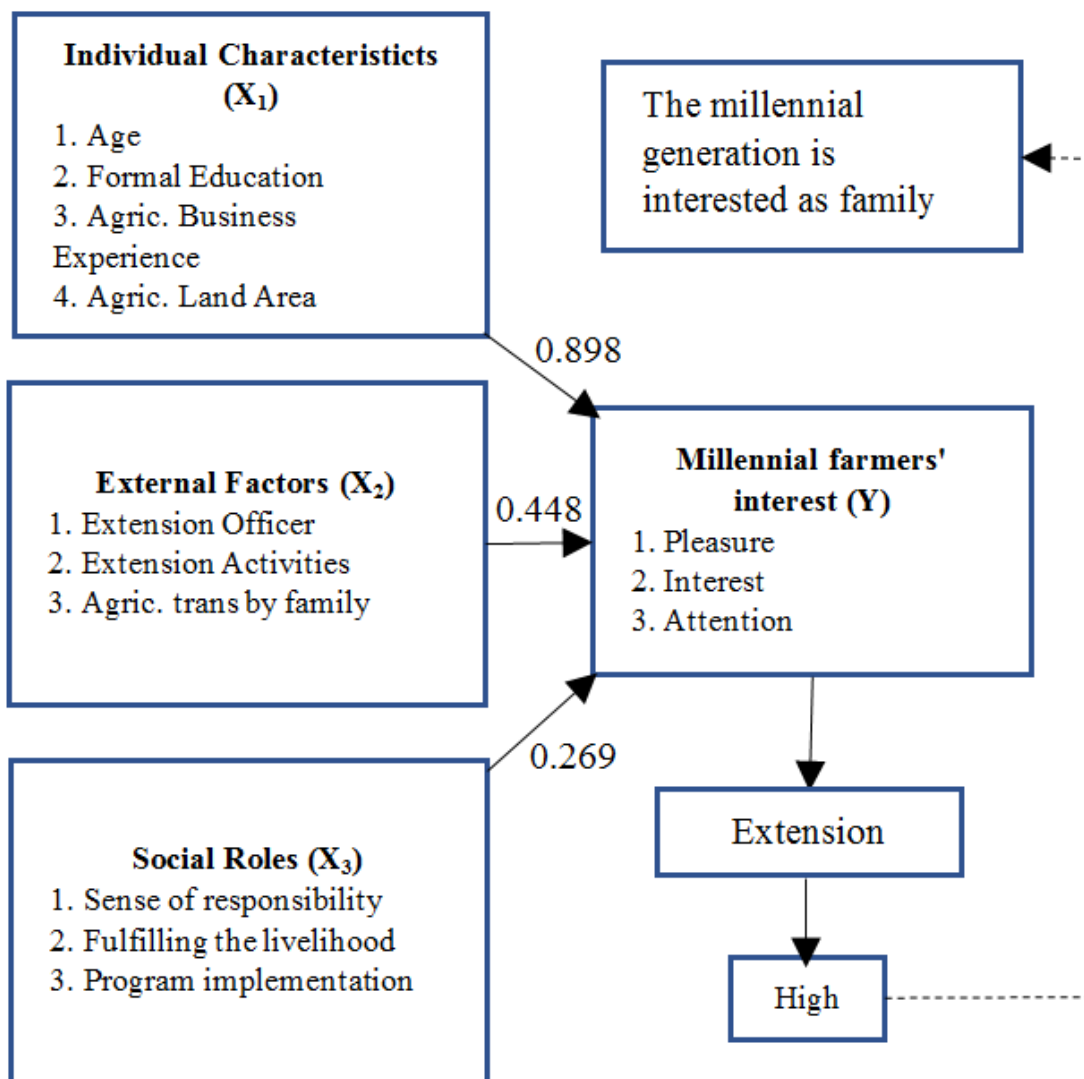


Figure 6. Millennial Farmers' Interest Improvement Model

5. Conclusions

The study conclusions: (1) the millennial farmers' interest as family agricultural successors carried through the hydroponic application was very high ($\geq 80\%$), (2) the individual characteristics, such as age, education, land area, and experience, external factors, such as extension officer roles, extension activity, parents' transmission, and governmental support obtained a significant influence on the interest to continue the family agricultural business; (3) the strategy to improve the interest owned by the millennial farmers can be started from utilizing the potential, mainly sufficient education, relatively young age, and productive to optimize the activity and roles of the extension officers in socializing the agricultural program, followed by the parental behavior to encourage their kids to be more attentive, characterized, and pleased should still be carried and remain as the main focus.

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