

## Improvement of Farmers 'Competency for Agriculture Progress



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**ABSTRACT:** The success of the agricultural sector is determined by a strong agricultural system, the use of appropriate agricultural tools, and the competence of farmers in running agricultural systems and equipment effectively. The analysis found that 65.2 percent of farmers in Indonesia have primary school education, and 64.2 percent are over 45 years old. Low education, and the age of farmers who are dominated by parents are obstacles in advancing the agricultural sector in Indonesia. The contribution of the agricultural sector in national development is high, but the welfare of farmers is still low due to the lack of mastery of agricultural techniques, lack of ability to face climate change, and low mastery of marketing networks. Various efforts have been made to improve the competence of farmers, both government and private. Although various obstacles have yet to be resolved in improving farmer competence, the spirit of developing agriculture is still a priority.

**KEYWORDS:** Farmers' Competency, Agriculture Progress, Agriculture in Indonesia

### I. INTRODUCTION

Agricultural development has a strategic role in the national economy. This strategic role is in line with Indonesia's development goals, namely in order to improve people's welfare, accelerate economic growth, reduce poverty, provide employment, and maintain the balance of natural resources and the environment (Kementan, 2009; Saragih, 2010; Todaro & Smith, 2014). Agricultural development is still the government's strategic effort in meeting food needs, alleviating poverty, reducing unemployment, eliminating malnutrition, and eliminating economic disparities between regions <sup>4-6</sup>. The Strategic Plan of the Ministry of Agriculture (Kementan) for 2015-2019 states that the vision of Indonesian agricultural development is the realization of a sustainable bio-industrial agricultural system that produces a variety of healthy foods and high value-added products based on local resources for food sovereignty and farmer welfare <sup>1</sup>. This means that the government is still paying serious attention to continuing to build the agricultural sector through various efforts so as to realize agricultural independence to achieve food security.

The need for food will continue to increase in number, diversity and quality, in line with population developments in the quality of life of the community. The large population of Indonesia requires a large enough food supply, which of course will require a large amount of effort and resources to fulfil it. Increasing human resources is not only limited to increasing farmer productivity, but also increasing the ability of farmers to play a more role in the development process. A crucial issue in the agricultural sector in Indonesia is the decreasing interest of the people in the agricultural sector. Based on the agricultural census by the Central Statistics Agency, for 10 years (2003 - 2013) there has been a decrease in the interest of farming communities and farmers who are dominated by those over 40 years of age. The number of dominant old age farmers and the declining interest of young people to work in the agricultural sector is also experienced by other countries, not only countries in Asia that have limited land, but also in European countries and Canada <sup>7-10</sup>.

The reasons for the decline in the interest of young workers in the agricultural sector are mainly the image of the agricultural sector which is less prestigious and unable to provide adequate compensation. This stems from the relatively narrow land holdings for the farming business. Another reason is that the perspective of the young workforce has changed in the era of postmodern societal development like now. For young people in rural areas, the agricultural sector is increasingly losing its appeal. Not only because economically the agricultural sector is becoming less promising, but the reluctance of young people to farm is actually also influenced by the new subculture that is developing in the digital era like now. The crisis of young farmers in the agricultural sector and the dominance of old farmers has consequences for the development of the sustainable agricultural

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sector, particularly on agricultural productivity, market competitiveness, rural economic capacity, and further this will threaten food security and the sustainability of the agricultural sector (Susilowati, 2016).

The problem that must be resolved immediately to achieve self-reliance in agriculture is increasing the competence of existing farmers. The determining factor for the success of agricultural independence is education owned by farmers, both formal and non-formal education (Marliati et al 2010). Indonesian farmers are currently dominated by those over 40 years of age and educational levels, most of which have only graduated from elementary school. Based on the BPS agricultural survey in 2013, 32.7 percent did not complete elementary school, 39.9 percent graduated from elementary school, and 27.4 percent graduated from junior high school (SMP) and above <sup>13</sup>. The low level of farmer education reflects the low level of competence which will certainly experience difficulties in dealing with various problems, ranging from access to production facilities, access to agricultural extension, calculation of profit predictions, and farmers as direct consumers of agricultural products <sup>14</sup>. This is not to mention the increasing decline in agricultural land due to the conversion of agricultural land to other sectors. Farmers will face heavier challenges today in the next 10 years, where the age of farmers is getting older coupled with slower decision making due to avoiding the risks faced.

During the Covid-19 pandemic, the objectives of agricultural development were hampered. Farmers' ability to deal with situations like this is still very minimal due to the low level of farmers' knowledge <sup>14</sup>. Even though most of the work is done in a crowd. Some farmers eventually have to ignore this recommendation to continue carrying out agricultural activities in order to continue to earn income for their daily needs. In fact, based on research by the Indonesian Institute of Sciences (LIPI), the majority of farmers in Indonesia are aged 45-52 years <sup>15</sup>. This age range is the group most vulnerable to Covid-19 infection. Even now, the death rate due to Covid-19 is mostly in the age range of 40 - 60 years <sup>16</sup>.

The low quality of human resources in the agricultural sector is also caused by the low number of agricultural extension agents. Even one agricultural extension worker must be responsible for two or more villages <sup>17</sup>. Whereas the resources of farmers / agribusiness actors as well as agricultural extension officers are the two main pillars in agricultural development, especially agribusiness development and business systems. Quality human resources are an absolute prerequisite for the success of agricultural development. For this reason, it is necessary to increase the competence of farmers at this time so that they are able to face future challenges in addition to improving the agricultural system in order to attract young people to enter the world of agriculture.

Realizing independence in agriculture, of course, requires several steps. Knowledge of human resources in the agricultural sector is needed to find out how much potential is still held in the agricultural sector. In addition, the role of farmer competence in agricultural development must be examined, as well as how strategies can be implemented to increase farmer competence to achieve self-reliance in agriculture.

## **II. METHOD**

This research is a systematic literature review, which explains that the research and development methodology is carried out to combine and assess research that is tied to the core of a particular topic. The purpose of a systematic literature review is to examine, identify, assess, and interpret all research related to the topic of an interesting phenomenon with various questions in certain appropriate studies <sup>18,19</sup>. This research uses descriptive analysis, namely regular presentation related to the data obtained, then providing an understanding and explanation so that the reader can understand it. This research was conducted in five stages. First, reviewing data on agriculture. Second, identify problems related to agriculture. Third, formulating problems related to the focus of the problems being studied and analyzed. Fourth, collect data and material related to the focus of the problem in order to support the strength of the analysis of existing problems. Fifth, analyze and present the improvement farmers' competency for agriculture progress. Although in practice without applying it directly, because this research can be analyzed and reviewed from various journals and books.

## **III. RESULT AND DISCUSSION**

### **Farmers Human Resources in Indonesia**

In promoting and increasing production in agriculture, basic objectives are needed to improve the welfare and independence of the community related to the quality of humans in managing cultivated land. The agricultural sector as one of the economic factors includes a sector that has great potential in contributing to national economic growth and development, both in terms of income and employment. The development approach in the past was very oriented towards economic growth with the hope that it would have an effect on improving people's welfare, but experience shows that this situation cannot be proven by Baswir (1999). This can only be built through the teaching and learning process by developing an effective and efficient non-formal education system outside of schools, including through agricultural extension. Human resources that can be

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said are minimal to manage agricultural businesses in order to increase agricultural production which will affect the welfare of farmers. This is what makes agriculture need important attention because it involves the life of the general public.

Absorption of the largest agricultural sector workforce among other sectors. For 4 years (2015-2019) the population working in the agricultural sector experienced a decline. However, due to the covid-19 pandemic in 2020, the population working in the agricultural sector increased as can be seen in Table 1.

In Table 1, it can be seen that the number of labour force working in the agricultural sector is 29.75 percent and is the most compared to other sectors. Although the number of people working in the agricultural sector has decreased in 2016-2017 and 2018-2019, in August 2020 when the world was hit by the Covid-19 pandemic, the number of people working in the agricultural sector experienced an increase of nearly 3 million people. This is due to unemployment due to termination of employment, many of whom return to the village and choose to work as farmers.

The large number of people working in the agricultural sector is not a guarantee that food security can be achieved <sup>21</sup>. Statistically, the number of farmers in Indonesia is more than the number of workers in other sectors. However, when viewed from the level of education they have, farmers are the group of work with the lowest level of education. There are more farmers with basic education as shown in Table 2.

**Table 2. Farmer's Education Level 2015-2020**

Education	2015 (pax)	2016 (pax)	2017 (pax)	2018 (pax)	2019 (pax)	2020 (pax)
Uneducated	11,644,819	11,320,548	11,406,649	11,395,980	10,979,557	9,068,582
Elementary school	15,032,024	14,870,958	13,578,926	13,683,196	12,966,035	15,866,309
Junior High School	6,288,606	6,258,381	6,016,634	6,115,322	5,965,143	6,791,164
Senior High School	4,400,684	4,832,136	4,454,008	4,875,517	4,994,047	5,802,369
University	382,095	488,142	467,669	507,965	545,509	695,947
Total	37,748,228	37,770,165	35,923,886	36,577,980	35,450,291	38,224,371

**Source:** BPS, 2020b

Table 2 shows that in 2020 as many as 65.2 percent of Indonesian farmers have no primary or primary school education. Even though every year the number of low-educated farmers is decreasing, this number is still very large. On the other hand, there is an increase in highly educated farmers every year in the last 5 years, which means that more scholars are interested in working as farmers. The higher education that farmers have, it is believed that they can increase agricultural output <sup>23</sup>. The higher the education of farmers, the higher the competence of farmers so that they can increase agricultural production capacity <sup>24</sup>. Education in agriculture plays an important role in increasing agricultural productivity <sup>25</sup>. Education that plays a role in agricultural productivity will ultimately increase the household income of <sup>23,26,27</sup>. This has been proven in India, that the higher education a farmer has, the easier it will be to adopt modern technology for increasing agricultural productivity (Paltasingh & Goyari, 018). Apart from formal education, informal education can also increase agricultural productivity. As in Ethiopia, which develops informal education through exchange of ideas between farmers so that it can improve farmers' abilities and skills in farming <sup>29,30</sup>. Ivory Coast is also able to increase the productivity of maize farmers through basic education of its farmers <sup>31</sup>. Providing basic agricultural education, is able to make farmers face the difficulties they face so that production can continue to be increased.

The age factor is also a concern in the agricultural sector. The age of Indonesian farmers aged between 45 - 65 years is 64.2 percent, while young farmers aged less than 25 to 44 years are 35.8 percent <sup>32</sup>. Even the number of young farmers under 25 years is only 8 percent <sup>33</sup>. This means that the younger generation is still not interested in working as farmers. Even though the age of farmers plays an important role in agricultural productivity <sup>26</sup>. It is highly recommended to encourage young people to get involved in agriculture so that they can more easily adopt new agricultural patterns and agricultural technologies such as in Nigeria <sup>34</sup>. The impact of farmers with old age is being felt in China. Old farmers who intend to stop working have lower productivity due to the slow adoption of technology <sup>35</sup>. There is a need for coaching for old farmers to be able to adopt technology which has an impact on the cost of coaching carried out.

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**Table 1. Population aged 15 years and over who work according to Main Work 2015 - 2020 (pax)**

No.	Main Occupation Fields	2015	2016	2017	2018	2019	2020
1	<b>Agriculture, Forestry and Fisheries</b>	<b>37,748,228</b>	<b>37,770,165</b>	<b>35,923,886</b>	<b>36,577,980</b>	<b>35,450,291</b>	<b>38,224,371</b>
2	Mining and excavation	1,317,328	1,469,846	1,386,900	1,466,215	1,428,556	1,352,236
3	Processing industry	15,537,848	15,874,689	17,558,632	18,535,303	19,197,915	17,482,849
4	Procurement of electricity, gas, steam / hot water and cold air	201,245	259,638	302,385	344,124	363,635	303,551
5	Water Supply, Waste Management and Recycling, Waste and Garbage Disposal and Cleaning	267,449	241,758	414,627	479,422	502,283	490,984
6	Construction	8,208,086	7,978,567	8,136,636	8,457,293	8,675,449	8,066,497
7	Wholesale And Retail Trade; Car and Motorcycle Repair and Maintenance	21,346,857	21,554,455	22,477,345	23,460,412	24,163,931	24,702,695
8	Transportation and Warehousing	4,621,212	4,970,325	5,064,247	5,491,679	5,656,314	5,591,941
9	Provision of Accommodation and Provision of Food and Drink	5,238,142	6,251,527	6,904,745	7,766,077	8,562,226	8,543,794
10	Information and Communication	541,360	683,504	819,210	904,536	921,191	933,273
11	Financial Services and Insurance	1,670,111	1,730,759	1,724,544	1,819,837	1,775,289	1,557,927
12	Real Estate	289,926	355,746	305,066	393,758	403,906	393,665
13	Company Services	1,365,643	1,437,413	1,663,893	1,684,852	1,943,089	1,796,755
14	Mandatory Government Administration, Defense and Social Security	4,030,001	4,986,503	4,581,690	4,766,102	4,947,873	4,569,946
15	Education services	5,605,822	6,085,285	5,978,228	6,167,853	6,416,322	6,028,610
16	Health Services and Social Activities	1,459,731	1,753,332	1,781,975	1,879,729	1,982,709	2,005,522
17	Other services	5,368,121	5,005,101	5,997,759	6,087,014	6,364,292	6,409,568
<b>Total</b>		<b>114,819,199</b>	<b>118,411,973</b>	<b>121,022,423</b>	<b>126,282,186</b>	<b>128,755,271</b>	<b>128,454,184</b>

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### Role of Competence of Farmers in Agricultural Development

Limited human resources (HR) in the agricultural sector do not reduce the contribution of the agricultural sector to the Gross Domestic Product (GDP). The contribution of the agricultural sector from 2015 to 2020 is still high, although it is still lower than the processing industry sector which averages 20 percent. The contribution of the agricultural sector in Gross Domestic Product (GDP) can be seen in Table 3.

**Table 3. Agricultural Sector Contribution to Gross Domestic Product based on 2015-2020**

Year	Contribution (%)
2015	13,49
2016	13.48
2017	13.16
2018	12.81
2019	12.71
2020	13.70

Source: Kementan, 2020

Table 3 shows that the contribution of the agricultural sector to national development is quite high. Although it has decreased from 2015-2019, the contribution of the agricultural sector to GDP will increase in 2020. The increase in the contribution of the agricultural sector in 2020 is believed to be due to the Covid-19 pandemic, where most of the population who lost their jobs chose to return to farming. Even though the competence of the farmers is still low, they are still able to make a big contribution to national development. For this reason, it is necessary to rebuild the agricultural sector by increasing the competence of farmers so that agricultural productivity can be increased which leads to farmer welfare and national food security.

The success of farmers in farming is closely related to their competencies to increase production and farm managerial. Competence is reflected in the character of the farmer, both socially and economically. Agribusiness competence is the ability of farmers to think, behave and act in planning a farming business to get benefits from farming, build cooperation between agricultural subsystems, manage post-harvest food to achieve added value for agricultural products, and realize sustainable agricultural activities<sup>37</sup>

One country that is known to have an advanced agricultural sector is Japan. Japan is well known for its food and agricultural industries. The Japanese government implements four pillars of Japanese agricultural development, one of which is Farm Size Expansion<sup>38</sup>. This policy aims to increase agricultural land ownership from four hectares to 15-20 hectares for each farming family. In addition, the agricultural technology used in the country is also very sophisticated. Government support for the Japanese agricultural sector is very high. Development of human resources (HR) in the agricultural sector is carried out to be able to use sophisticated agricultural tools so that they are able to optimize the land provided by the government. This increase in agricultural output will certainly have an impact on the welfare of farmers and national economic progress.

Taking advantage of a very large population, the Chinese government encourages its residents to carry out agricultural innovations in order to meet the country's food needs. One of the ways that the Chinese government continues to do is by increasing the knowledge of its population so that they can farm more modern<sup>39</sup>. Apart from improving farming methods, the Chinese government continues to develop technology in agriculture. Of course, the development of this technology will not be successful if it is not carried out by human resources who have adequate competence (Jiao et al., 2018). For this reason, the government emphasizes continuing to improve the competence of farmers so that they can continue to adopt the resulting technological advances.

Nigeria also seeks to increase the development of the agricultural sector<sup>41</sup> by increasing the competence of its farmers<sup>41</sup>. Agricultural innovation development is carried out by training farmers to use renewable technology. Increasing farmer competence will make it easier for farmers to absorb new agricultural technology so that limited land is not an obstacle in increasing agricultural output. This is done to improve the country's development so that poverty can be reduced<sup>42</sup>. In addition to mastery of technology, eastern European countries such as Lithuania, Poland and Slovenia have increased the entrepreneurship of their farmers. Competency enhancement is carried out for agricultural technical development, technology adoption, and cost efficiency so that the sustainability of agriculture can be maintained in the future<sup>43</sup>.

The low quality of agricultural human resources is a serious obstacle in agricultural development, farmers with low education are generally farmers who live in rural areas<sup>12</sup>. This condition is also exacerbated by the lack of agricultural extension assistance<sup>44,45</sup>. On the other hand, those who have received formal education at the secondary and tertiary levels are less interested in working and doing business in agriculture, resulting in high urbanization to cities. This condition can be suppressed

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by developing agricultural agro-industry in rural areas, because it will be able to create new jobs and agro-industrial business opportunities in rural areas <sup>2</sup>. The agro-industry in this village plays an important role in the production process such as the provision and distribution of production facilities, agricultural equipment and machinery service businesses, post-harvest and product processing industrial businesses, agricultural product transportation services businesses, management of microfinance institutions, agribusiness management consultants and marketing personnel. agro-industrial products.

In general, the agricultural sector has not been able to provide high added value for both the income and welfare of farmers. This is the reason the young generation's interest in the agricultural sector is very limited and it is difficult to pursue it <sup>15</sup>. Responding to the challenge of increasing farmer competence in the future is to attract the younger generation to engage in agriculture. One of the efforts that can be made to increase the attractiveness of the younger generation to the agricultural sector is to build a more advanced and modern agriculture based on innovation and technology that is able to produce products of high economic value that the market needs. Developing agriculture in an industrial context that is conditional on innovation and technology that handles upstream to downstream will provide great opportunities to produce various agricultural products with high economic value <sup>46</sup>. The increase in the value of agricultural products causes an increase in farmers' income so that the welfare of the agricultural sector is more promising.

### Farmers Competency Improvement Strategy

Badan Penyuluhan dan Pengembangan SDM Pertanian (BPPSDMP), the Ministry of Agriculture has three pillars that must move together in increasing agricultural competence, namely education, extension and training that can increase agricultural productivity <sup>47</sup>. Increasing agricultural productivity and developing Human Resources (HR) Agriculture is one of the government's aspirations to create food security towards the world food barn 2045. Agricultural extension continues to strive to improve the institutional, quality and quantity of extension workers both at the sub-district to village level. Extension workers must also update their agricultural knowledge to suit current needs. Training is also provided for extension workers to increase their capacity. Because extension workers are not only able to mobilize, but also have to be able to guide their groups to be able to increase productivity and production <sup>48</sup>.

The low competence of farmers is a serious concern for improvement. Increasing agricultural competence is needed to achieve self-reliance in agriculture. So far, farmers are still very dependent on assistance provided by the government and the private sector. One of the efforts made by the government and assisted by the private sector is the distribution of agricultural extension workers to villages. The government has made every effort to increase the number of agricultural extension agents so that agricultural output can be increased as shown in Table 4.

**Table 4. Number of Agricultural Instructors 2017 - 2020**

Year	Number (pax)
2017	68.779
2018	67.518
2019	72.730
2020	73.713

Source: Kementan, 2020b

The increase in agricultural extension officers every year indicates that the government is serious about increasing the competence of farmers. The number of additional agricultural extension agents to participate in providing training, monitoring and evaluation is still lacking. In 2020 the number of agricultural extension agents was 73,713, while the number of administrative villages in Indonesia was 82,709 villages. This means that there are agricultural extension workers who must be responsible for providing extension to more than one village.

Several activities of the Ministry of Agriculture that use an empowerment approach include the Small Farmer-Fisherman Income Improvement (P4K) activities, Participatory Integrated Development in Rainfed Areas (PIDRA), Project for Increasing Farmers' Income through Innovation (P4MI) or Poor Farmer's Income Improvement Through Innovation Project (PF13P), as well as the Agricultural Technology Innovation Preliminary and Acceleration Program <sup>50</sup>. These four activities are action activities that are directly implemented in the field by taking separate locations based on the concepts and approaches of each activity. The application of participatory principles is different for each activity, which can be seen in the table below <sup>51</sup>.

There are several inhibiting and supporting factors in the implementation of empowerment. Inhibiting and supporting factors in efforts to empower farmers to improve food security are divided into internal and external inhibiting factors and external and internal supporting factors. Internal inhibiting factors are the low quality of human resources and the lack of

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agricultural machinery. External inhibiting factors are erratic weather and limited agricultural resource capacity. Meanwhile, the internal supporting factor is the existence of a farmer empowerment program and local government support and external support is the assistance that can ease the burden on farmers<sup>52</sup>.

Empowerment is also carried out by the private sector through the Corporate Social Responsibility (CSR) program. The short-term positive impact that is generated is a more efficient program, a more sustainable program due to the strengthening of local institutions, reducing the flow of urbanization and possibly contributing to local revenue (PAD). Meanwhile, the negative impact is jealousy of farmers who are not involved in the program. External constraints that occur stem from differences in the culture of government and private organizations, the speed at which they move, and the presence of extreme weather. Meanwhile, internal constraints stem from the level of knowledge of farmers, limited access to information and the existence of local institutions themselves<sup>53</sup>.

Increasing the competence of farmers really depends on the role of agricultural extension. The role of extension workers as communicators, facilitators, educators, and communicators has a positive effect on increasing farmer competence<sup>54</sup>. Developed countries like Norway use agricultural extension agents to improve communication, provide knowledge, and open wider networks to farmers so that farmers in the future can independently face the problems they face<sup>24</sup>. In Australia, farmer competency improvement is done by providing training in dealing with climate risks. Training is provided so that farmers are able to anticipate climate change that occurs so that agricultural products can always be maintained<sup>55</sup>.

Independence in agriculture will be realized if farmers are able to master skills in production, ability in planning and selling agricultural products, ability to manage finances, skills in managing human resources, ability to create competitive advantage, ability to create networks, ability to manage risks, and ability to deal with conditions outside agriculture<sup>56</sup>. The competence of farmers in developing countries is still lower than in developed countries. Low financial management skills, as well as skills to market agricultural products, have resulted in many farmers getting into financial problems and often relying on third parties (brokers) to sell agricultural products<sup>57</sup>. Farmers in developing countries can imitate farmers in France in selling their agricultural products by implementing product standardization and building the identity of the products being sold<sup>58</sup>. In addition, it can also be done by selling agricultural products through tourism, such as in the United States. Sales of agricultural products are carried out by bringing tourists directly to agricultural areas to enjoy agricultural nature directly so as to provide added value for tourists<sup>59</sup>.

Taking into account the existing strengths, weaknesses, opportunities and challenges, the following can be recommended: first, farmer empowerment programs should be integrated not only with regard to financial aspects but also aspects of research and development as well as aspects of post-production handling. Integration is carried out across departments / agencies under the coordination of regional heads; secondly, the plant commodities to be developed should be varied, not only horticultural crops and food crops but also industrial plants adapted to the suitability of agro-climatic elements and regional potential by developing the concept of "one product one village".

## IV. CONCLUSION

The agricultural sector in Indonesia is able to accommodate the largest number of workers compared to other sectors. Although they accommodate the most labour, most of the farmers have basic education. In addition, the age of farmers is dominated by those aged 40 years and over, making it difficult to absorb more modern agricultural technology. Farmers' competence is crucial in improving the agricultural sector. Farmers who have high competence will be able to face all kinds of challenges they face. The application of more modern technology, the ability to deal with climate change, and the expansion of agricultural networks are keys to the success of the agricultural sector. Various efforts have been made by the government and the private sector in increasing the competence of farmers through work programs and assistance from agricultural extension agents. The obstacles that occur to improve farmers' competence are challenges to be solved, so that agricultural independence can be realized.

## V. REFERENCES

- 1) Kementan. *Rencana Strategis Kementerian Pertanian Tahun 2015-2019*. Jakarta: Jakarta : Badan Penelitian dan Pengembangan Pertanian; 2014.
- 2) Saragih B. *Agribisnis Paradigma Baru Pembangunan Ekonomi Berbasis Pertanian*. Bogor: Bogor : IPB Press; 2010.
- 3) Todaro M, Smith S. *Economic Development*. New York: New York : Pearson Education Press; 2014.
- 4) Eicher CK, Staatz JM. *International Agricultural Development*. London: London : The John Hopkins University Press; 1998.
- 5) Azra A. *Revitalisasi Pertanian Dan Dialog Peradaban*. Jakarta: Jakarta : Kompas; 2006.
- 6) Bank W. *World Development Report: Agricultural for Development*. Washington DC: Washington : World Bank; 2009.

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- 7) Murphy D. *Young Farmer Finance*. Australia: Nuffield Australia Project No. 1203; 2012.
- 8) Commission E. *Rural Development In The European Union: Statistical And Economic Information Report 2012*. Brussel: Brussel (BG): The European Directorate-General for Agriculture and Development.; 2012.
- 9) Wang J. Recruiting Young Farmers To Join Smallscale Farming: A Structural Policy Perspective. *Int Semin Enhanc Entry Young Gener into Farming*. 2014.
- 10) Uchiyama T. Recent Trends In Young People's Entry Into Farming In Japan: An International Perspective. *Int Semin Enhanc Entry Young Gener into Farming*. 2014.
- 11) Sri Hery Susilowati. Farmers Aging Phenomenon and Reduction in Young Labor : Its Implication for Agricultural Development. *Forum Penelit Agroekon*. 2016;34:35-55.
- 12) Marliati, Sumardjo, Asngari PS, Tjitropranoto P, Saefuddin A. Faktor yang Berpengaruh terhadap Kemandirian Petani Tanaman Pangan Beragribisnis. *Forum Pascasarj*. 2010;33(3):221-228.
- 13) Idris M. Mayoritas Petani RI Berusia 45-54 Tahun dan Tamatan SD. *Detik Finance*. 2017.
- 14) Wastutiningsih SP, Wati RI, Maulida YF, Andini R. *Petani Tangguh Di Masa Bencana : Studi Kasus Covid-19*. Yogyakarta: Yogyakarta : Fakultas Pertanian UGM; 2020.
- 15) Hasan AM. Indonesia Krisis Regenerasi Petani Muda. *LIPI*. 2017.
- 16) Lova C. Usia di Bawah 45 Tahun Dianggap Tak Rentan Covid-19, Bagaimana Faktanya di Kabupaten Bekasi? *Kompas.com*. 2020.
- 17) Yustika AE, Baksh R. Konsep Ekonomi Kelembagaan Perdesaan, Pertanian, dan Kedaulatan Pangan. In: Malang: Empat Dua. Malang; 2015.
- 18) Gunawan I. *Metode Penelitian Kualitatif: Teori Dan Praktik*.; 2014.
- 19) Sugiyono. *Metode Penelitian Kombinasi (Mix Methods)*. Bandung: Alfabeta; 2015.
- 20) Baswir R. *Reformasi Birokrasi Di Nusantara*. Yogyakarta: Yogyakarta : BPFE; 1999.
- 21) De T, Banga U, Vishwavidyalaya K, Singh RK. Agri-Horticultural Interventions for Doubling of Farmer ' s Income Agri-Horticultural Interventions for Doubling of Farmer ' s Income. 2019;(December). doi:10.20546/ijcmas.2019.812.171
- 22) BPS. Tingkat Pendidikan Petani. Badan Pusat Statistik. doi:<https://www.bps.go.id/subject/6/tenaga-kerja.html#subjekViewTab3>
- 23) Sulaiman S, Rasmahwati R. Hubungan Luas Lahan Dan Tingkat Pendidikan Dengan Peningkatan Pendapatan Usahatani Padi Di Desa Topore Kecamatan Papalang. *Agriфо J Agribisnis Univ Malikussaleh*. 2018;3(2):8. doi:10.29103/ag.v3i2.1123
- 24) Vik J, Stræte EP. Embedded Competence: A Study of Farmers' Relation to Competence and Knowledge. *Proc Food Syst Dyn*. 2017;0(0):392-403. doi:10.18461/pfsd.2017.1740
- 25) Luh Y, Road R. The Impact of Education on Agricultural Productivity: Evidence From East Asian Economies. *Int J Food Agric Econ*. 2017;5(4):11-24.
- 26) Susanti D, Listiana NH, Widayat T. The Influence of the Farmer Ages, Levels of Education and Land Area to Blumea Yields. *J Tumbuh Obat Indones*. 2016;9(2). doi:10.22435/toi.v9i2.7848.75-82
- 27) Ashraf M, Qasim M, Gul F. Impact of Education on Farmers Earning: A House Hold Survey Data Analysis. *Educ Res*. 2019;10(1):200-213.
- 28) Paltasingh KR, Goyari P. Impact Of Farmer Education On Farm Productivity Under Varying Technologies: Case Of Paddy Growers In India. *Agric Food Econ*. 2018;6(1). doi:10.1186/s40100-018-0101-9
- 29) Weir S. The Effects of Education on Farmer Productivity in Rural Ethiopia. *Cent Study African Econ Dep Econ Univ Oxford*. 1999:50.
- 30) Korgitet HS. The Effect of Farmers Education on Farm Productivity: Evidence from Small - Scale Maize Producing Farmers in North Bench District, Bench Maji Zone. *Res Humanit Soc Sci*. 2019. doi:10.7176/rhss/9-17-04
- 31) Ekou N. The Effect of Primary Education on Maize Productivity in Ivory Coast. *Eur Sci J*. 2015;11(25):203-217.
- 32) Jatim K. Jumlah Petani Muda di bawah 25 Tahun Naik 148 Persen. Dinas Komunikasi Dan Informatika Provinsi Jawa Timur. doi:<http://kominfo.jatimprov.go.id/read/umum/jumlah-petani-muda-di-bawah-25-tahun-naik-148-persen>
- 33) Setiawan K. Kementerian Pertanian: Petani Muda Hanya 2,7 Juta Atau 8 Persen. *TempoCo*. 2020. doi:<https://bisnis.tempo.co/read/1330943/kementerian-pertanian-petani-muda-hanya-27-juta-atau-8-persen>
- 34) Fasina OO. Farmers Perception of the Effect of Aging on their Agricultural Activities in Ondo State, Nigeria. *Belogradchik J Local Hist Cult Herit Folk Stud*. 2013;4(3):371-387.
- 35) Guo G, Wen Q, Zhu J. The Impact of Aging Agricultural Labor Population on Farmland Output: From the Perspective of Farmer Preferences. *Math Probl Eng*. 2015. doi:10.1155/2015/730618



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- 36) Kementan. Laporan Kontribusi PDB atas Harga Berlaku. Kementerian Pertanian Republik Indonesia. doi:<http://aplikasi2.pertanian.go.id/pdb/rekappdbkontri.php>
- 37) Harijati S. Potensi dan Pengembangan Kompetensi Agribisnis Petani Berlahan Sempit : Kasus Petani Sayuran di Kota dan Pinggiran Jakarta dan Bandung. *Repos IPB*. 2007.
- 38) Berele A. Beberapa yang Harus Dicontoh dari Pertanian Modern di Jepang. Direktorat Tanaman Pangan. doi:<http://tanamanpangan.pertanian.go.id/index.php/forum/main/view/140>
- 39) Huang J, Rozelle S. China's 40 Years of Agricultural Development and Reform. In: *China's 40 Years of Reform and Development: 1978–2018*. ; 2018:487-506. doi:10.22459/cyrd.07.2018.24
- 40) JIAO X qiang, Mongol N, ZHANG F suo. The Transformation of Agriculture in China: Looking Back and Looking Forward. *J Integr Agric*. 2018;17(4):755-764. doi:10.1016/S2095-3119(17)61774-X
- 41) Akanbi AO, Sidiq OM, Ben O. Strategy For Agricultural Intensification In Nigeria: Emphasis On Agricultural aviation. *Int Educ Sci Res J*. 2019;5(6):32-36.
- 42) Edet EO, Udoe PO, Ifang ED. Resource Use Efficiency of Ground Nut Farmers in Bekwara Local Government Area, Cross River State, Nigeria. *Glob J Agric Sci*. 2018;17(1):75. doi:10.4314/gjass.v17i1.9
- 43) de Lauwere C, Malak-Rawlikowska A, Stalgiene A, Kloplic M, Kuipers A. Entrepreneurship and Competencies of Dairy Farmers in Lithuania, Poland and Slovenia. *Transform Bus Econ*. 2018;17(3):237-257. doi:10.3920/978-90-8686-785-1
- 44) Aslamia, Mardin, Hamzah A. Peran Penyuluh Pertanian dalam Pengembangan Kelompok Tani di Kelurahan Matabubu Kecamatan Poasia Kota Kendari. *J Ilm Membangun Desa dan Pertan*. 2017;2(1):6-9. doi:10.33772/jimdp.v2i1.6650
- 45) Jufitra V. Perkembangan Penyuluhan Pertanian Dalam Mendukung Pertumbuhan Pertanian Di Indonesia. *Responsive*. 2019;1(3):1-8.
- 46) Rangkuti K, Harahap M, Rezeki W. The Role of Agriculture Instructor in Farmer Group Development Coffee Plant (Coffea) (Case Studies: in Jongkok Raya Village Bandar Subdistrict Bener Meriah Regency). *Agribus Sci*. 2018;01(02):128-134.
- 47) Abay U. Pengembangan Kompetensi Petani Milenial Untuk Meningkatkan Produksi Pertanian. *Swadaya Media Bisnis Pertanian*. 2019.
- 48) Manyamsari I. Karakteristik Petani Dan Hubungannya Dengan Kompetensi Petani Lahan Sempit (Kasus : Di Desa Sinar Sari Kecamatan Dramaga Kab. Bogor Jawa Barat). *Agrisep*. 2014;15(2):58-74. doi:10.24815/agrisep.v15i2.2099
- 49) Kementan. *Statistik SDM Pertanian Dan Kelembagaan Petani*. Jakarta: Jakarta : Pusat Data Dan Sistem Informasi Pertanian; 2020.
- 50) Kementan. *Rencana Strategis Direktorat Pembiayaan Pertanian Tahun 2015 - 2019*. Jakarta: Jakarta : Kementerian Pertanian Republik Indonesia; 2014.
- 51) Syahyuti. *Bedah Konsep Kelembagaan: Strategi Pengembangan Dan Penerapannya Dalam Penelitian Pertanian*. Bogor: Bogor: Pusat Penelitian dan Pengembangan Sosial Ekonomi Pertanian; 2003.
- 52) Mulder M. A Five-Component Future Competence (5CFC) Model. *J Agric Educ Ext*. 2017;23(2):99-102. doi:10.1080/1389224X.2017.1296533
- 53) Soesilowati E, Widiyanto. Model Corporate Social Responsibility Dalam Program Pemberdayaan Petani Hortikultura. *J Ekon*. 2011;12(1).
- 54) Managanta AA. The Role of Agricultural Extension in Increasing Competence and Income Rice Farmers. *Indones J Agric Res*. 2020;3(3). doi:<https://doi.org/10.32734/injar.v3i2.3963>
- 55) George D, Clewett J, Wright A, Birch C, Allen W. Improving Farmer Knowledge and Skills to Better Manage Climate Variability and Climate Change. *J Int Agric Ext Educ*. 2007;14(2). doi:10.5191/jiaee.2007.14201
- 56) Langemeier M, Boehlje M. What Skills and Competencies Do I Need to Grow ? *Farmadoc Dly*. 2018:1-3.
- 57) Herliana S, Aina Q, Sutardi A, Lawiyah N, Ulfah WN. Analysis Of The Competency On Agribusiness Activities In Developing And Developed Countries. *Acad Entrep J*. 2019;25(3):1-6.
- 58) Giannetti R. When Champagne Became French: Wine and The Making Of A National Identity. Baltimore. *Enterp Soc*. 2004;5(1):144-150.
- 59) Harrington LMB. Iternative and Virtual Rurality: Agriculture and the Countryside As Embodied in American Imagination. *Geogr Rev*. 2018;108(2):250-273.