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## 1 Article

# Entrepreneurial Literacy of Peasant Families during the COVID-19 Pandemic: A Case in Indonesia

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**Abstract:** Our research examines peasant families' entrepreneurial literacy and entrepreneurial behavior. The study was conducted in rural areas of North Morowali. This location is one of the agricultural bases in the Central Sulawesi Province (Indonesia). We employ a qualitative approach with a case study. The data were gathered through observation and in-depth interviews with six peasants. The key respondents were chosen through judgment sampling. The key respondents comprised two lowland rice peasants, two cocoa peasants, and two oil palm peasants. Despite the socio-economic restrictions due to the COVID-19 pandemic, peasant families continue to engage in agricultural entrepreneurship. Entrepreneurial literacy is obtained from interaction with the internal and external environment before the COVID-19 pandemic. The entrepreneurial literacy of peasant families denotes the knowledge and understanding of cultivation systems, quality seeds and seedlings, plant pests and diseases, fertilizers, pesticides, agricultural technology, post-harvest management, and market access. The low impact of the COVID-19 pandemic in rural areas is also due to its low population density compared to urban areas and limited mobility of peasants, thereby minimizing social contact, and the commodity being cultivated is a food commodity. We developed new insights into the peasants' literacy and entrepreneurial behavior model during the COVID-19 pandemic.

**Keywords:** peasant families; agricultural activities; entrepreneurial literacy; COVID-19 pandemic



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## 15 1. Introduction

The COVID-19 pandemic has brought a significant impact on the socio-economic life of countries around the world. In addition to threatening health, this pandemic has also caused a global economic slowdown [1–3]. Most countries are experiencing a downturn in Gross Domestic Product (GDP) growth [4,5]. Restrictions on social movements and mobility cause this condition, closing borders between regions and countries, isolation at home, the closing of schools, colleges, government offices, and other public facilities, and even the total lockdown implemented by several countries [2,4,5].

The slowdown and economic uncertainty due to the COVID-19 pandemic are terrible news. Industrial growth slowed down due to restrictions on the distribution of production inputs, decreased and canceled demand for goods from various countries, and employers closing factories, causing new threats in the form of termination of work contracts [3], lower wage rates [4], which further increasing unemployment [6,7]. There are also financial crises,

and the poor suffer even more because they cannot meet their basic needs [4,6]. These conditions raise fears of a deep and prolonged global recession [2,5,6,8].

Handling the epidemic and saving the economy is a serious concern. Therefore, economic policies are implemented without ignoring the COVID-19 health protocol. One of the fundamental aspects of food availability is availability because food production can decline, and the distribution is disrupted, causing scarcity and high prices [3,9,10]. Food insecurity must be minimized, and food security must be achieved so as not to cause more severe problems [9,10].

As the leading actor providing food commodities, peasants must quickly respond to this crisis [10]. The COVID-19 pandemic forced restrictions on the movement of agricultural businesses, which ultimately hampered the distribution of production inputs (fertilizers, quality seeds, feed, and pesticides) [2,10]. Limited production inputs and price levels that tend to be more expensive can affect peasants' production processes, decreasing agricultural yields and production. In terms of the COVID-19 pandemic, a global problem that can contribute to worsening the situation is climate change. This climate change can also disrupt the pattern of meeting the economic needs of peasants in rural areas [11]. One possible long-term impact is food insecurity which remains even higher [10]. Thus, it is interesting to understand how the entrepreneurial behavior of peasant families is amid the challenges of socio-economic restrictions during the COVID-19 pandemic.

Several researchers have researched the impact of the COVID-19 pandemic on socio-economic conditions in general [2,4–7] and food and agriculture sectors in particular [9,10,12]. The food and agricultural researches focus more on discussing the distribution of agricultural inputs and outputs amid the COVID-19 pandemic. Attention is paid to how to supply agricultural inputs, labor, access to output markets, rural finance, post-harvest management practices, and distribution of production outputs [10,12]. Meanwhile, agricultural research and development to produce long-term solutions continue to be needed [10]. For this reason, there is a research gap. In addition to the COVID-19 pandemic outbreak, facts in the field show that climate change is occurring through erratic rainfall intensity (such as the situation that occurred in the Zvimba district of the province of Zimbabwe in Mashizha's research) [11], circulation of non-certified seeds, increasingly varied types of pests and diseases with intense attacks, long agricultural input marketing chains, new agricultural technologies, and scarcity of fertilizers and pesticides. Therefore, it is important to understand the entrepreneurial literacy possessed by farmers through entrepreneurial competencies, which are then implemented in entrepreneurial behavior. Previous research on agricultural entrepreneurial literacy has been conducted, such as Clemons et al. [13]. They only focused on consensus on the definition of agricultural entrepreneurial literacy. Sokoya et al. looked at how the Fadama 3 (extension and training program) (Osun state, Nigeria) improves agricultural information literacy. The study only looked at how literacy was developed from the Fadama 3 program but did not examine how entrepreneurship literacy is developed through natural, socioeconomic interactions between farmers and their environment. Furthermore, their research does not demonstrate the true implications of farmers' income levels and ownership of agricultural entrepreneurial literacy through field practices [13]. Similarly, Rengganata et al. discuss the advantages of information literacy in mushroom cultivation [14]. Aside from focusing on a single agricultural commodity, the study does not distinguish between the sources of agricultural entrepreneurship literacy and the types of literacy received by farmers. As a result, it was clear that this study filled the gaps left by previous research.

Entrepreneurial literacy is a long-term capital to decide on a survival strategy during a pandemic, even after the new normal conditions. Thus, this research aims to answer the fundamental question of how entrepreneurial literacy and entrepreneurial behavior of farmers in rural North Morowali. This research is important because the COVID-19 pandemic has had a broad impact on the socio-economic life of the community, including farmers in rural areas. Food scarcity will occur if farmers, as the leading actors providing food commodities, do not have adequate entrepreneurial literacy and behavior. Low

entrepreneurial literacy causes farmers to be unable to determine adaptation strategies to changes due to the pandemic, such as changes in prices and scarcity of fertilizers, quality seeds, and pesticides, as well as obstacles to the marketing channel of agricultural output. Furthermore, low literacy will cause farmers to be unable to implement strategies in agricultural processing to improve business performance, maintain business sustainability and increase family income. Finally, this research will provide answers about where entrepreneurial literacy is obtained, how entrepreneurial literacy is formed, the forms of entrepreneurial literacy, and how this literacy is practiced. As a result, farmers can maintain business performance during the pandemic.

## 2. Literature Review

### 2.1. Entrepreneurship Education, Entrepreneurship Literacy, and Farming Business Sustainability

This research's focus is to determine farmer family entrepreneurial literacy in terms of entrepreneurial behavior during the COVID-19 pandemic. Although debatable, entrepreneurial literacy in agriculture is generally understood as knowledge and understanding of agricultural systems [15]. Agricultural entrepreneurship literacy involves knowledge and experience of scientific and technology-based agricultural concepts needed for individual decision-making, social and cultural participation, and economic productivity [15]. Meanwhile, entrepreneurship refers to doing new work and innovating in modern ways in everyday life [16]. The concept of entrepreneurship is often associated with behavioral characteristics or entrepreneurial attitudes [17]. Having new and modern ideas, starting and creating a business, having the courage to take risks, and introducing new products to the public are examples of entrepreneurial behavior [17]. Therefore, peasants who have an entrepreneurial orientation are the ones who are willing to innovate to increase market offerings, take risks, try new products, services, and markets, and become more active than other peasants in understanding market opportunities [18]. Finally, agricultural entrepreneurial literacy is a combination of agricultural production skills and business management, which includes technical and production skills, business management skills, business opportunity reading skills, business strategy implementation skills, and networking skills [19]. Thus, the basis of all entrepreneurial behavior of peasant families is the entrepreneurial literacy owned by the family. Furthermore, their entrepreneurial literacy will encourage competitiveness, innovation, and creativity [20] in managing agricultural businesses during the COVID-19 pandemic so that their efforts can sustain.

The entrepreneurial literacy of farming families can be formed either through entrepreneurship education obtained by farming families, both formally and informally [19,21]. Several recent studies show that there is a contribution between entrepreneurship education towards the formation of entrepreneurial literacy and business sustainability during the COVID-19 pandemic. Entrepreneurial resilience during the crisis caused by the COVID-19 pandemic tends to occur in urban areas because human development in rural areas is still low [22]. Therefore, it is important to explore the entrepreneurship education process in an effort to form entrepreneurial literacy. The findings of Lopes et al. show that an educational strategy is important to create entrepreneurial literacy that is able to provide knowledge, understanding, experience, and entrepreneurial skills to be able to survive during the COVID-19 pandemic [23]. From the case of Indonesia, from the perspective of informal education, Hasan's findings show that entrepreneurship education has a major impact on the formation of entrepreneurial literacy through the transfer of knowledge within the family, especially those related to soft skills and hard skills in entrepreneurship [24]. The process of forming entrepreneurial literacy through entrepreneurship education will contribute to business sustainability.

### 2.2. Sources and Forms of Entrepreneurial Literacy

Peasant families can obtain various benefits if they have good entrepreneurial literacy. Individual peasants can bring good literacy by synthesizing knowledge from multiple sources [25]. Entrepreneurial literacy can be obtained through networking with other

entrepreneurs and related stakeholders. Through the network, there is an exchange of information that increases the knowledge and skills of peasants [25–27]. The agricultural information absorbed from the environment can shape the literacy of peasant families, such as knowledge of modern cultivation, quality seeds and seedlings, plant diseases, the use of new agricultural technologies, post-harvest management, and others [13,14,28,29]. The form of peasant knowledge reflecting entrepreneurial behavior is seen from peasants' understanding of managing their business, technical knowledge of cultivation, land preparation, fertilization, the wise use of pesticides, and plant maintenance. Thus, self-capacity through organizing a business and learning and knowledge becomes important for building business resilience and overcoming risks [30].

In addition, peasants face many social-environmental pressures due to changes in the global environment [30]. Therefore, it is necessary to adapt to them [30], especially during the current COVID-19 pandemic. Social interaction—inside and outside the community—is crucial in creating agricultural entrepreneurial behavior [26]. The participation of peasants in sharing ideas, opinions, and expertise in their environment will enable them to follow the developments and be innovative [25]. The agricultural entrepreneurial knowledge obtained from the environment can encourage adaptive behavior in peasant families [13,28,31]. In managing agricultural enterprises, the peasants can adjust their behavior and adopt the necessary adaptation strategies [30]. This adaptive behavior can be seen in agricultural practices based on knowledge obtained from the socio-economic environment. The awareness of correct agricultural practices is the key to increasing agricultural productivity and ensuring food security [13]. In this research, the behavior can be referred to as an action or a tangible manifestation of entrepreneurial intentions [32]. Thus, the main factors that influence human behavior are environmental factors [33,34]. The peasant family behavior results from interaction with the social and economic environment. It can be seen through concrete actions, such as applying any knowledge or understanding gained from the environment.

The combination of networks in the external and internal informal environment forms the basis for the knowledge and behavior of peasants for community-based adaptive agricultural management in rural areas [35,36]. The external environment helps access information unavailable locally or internally [35]. The peasants who have relationships with external actors are more successful in agricultural management [35], such as having social networks, peasant groups, extensions, and training and connections with peasants from various regions [27,35,37].

The internal environment is a family environment consisting of parents and grandparents from whom the peasants gain the initial knowledge about agriculture. Family members often encourage each other's curiosity, learning process, and creativity [25]. Thus, new information obtained from the external environment is combined with internal knowledge, which is then adapted locally in the internal network for community purposes [35]. Then, it becomes a unified resource (knowledge and understanding) owned by the peasant families. The knowledge gained from the family or other peasants is often utilized as an initial motivator and guide in agriculture for young and new peasants. Experience, knowledge, and skills gained in early year agriculture are crucial for the peasants' decisions [25].

### 2.3. Entrepreneurial Competence

The existing literature shows that peasant entrepreneurship literacy comes from both the internal and external environment, emphasizing that it is important to understand entrepreneurship. The entrepreneurial process can be divided into three categories, namely: (1) Entrepreneurial Behavior—including seeking and taking advantage of opportunities, having initiative, being creative, being able to overcome and solving problems, being independent and responsible, building networks effectively, and being able to consider various risks; (2) Entrepreneurial Attributes—including achievement orientation and ambition, self-confidence, performance, action orientation, learning by doing, perseverance, determination and creativity; and (3) Entrepreneurial Skills—consisting of creative problem

solving, negotiation skills, ability to manage business, project or situation holistically, think strategically, and make intuitive decisions under uncertainty [20].

There are two main streams of literature to understand the role of entrepreneurs in the success of their businesses, including competency-based and personality-based literature [17]. This research focuses on the discussion of competence. Competence is based on education, experience, knowledge, and understanding, which can be developed. The entrepreneur's competence is then demonstrated through action or behavior. The main implication of entrepreneurial competence is business performance [17]. Thus, the assumption proposed in this research is the entrepreneurial behavior of peasant families based on entrepreneurial literacy during the COVID-19 pandemic.

### 3. Methods

This research uses a qualitative approach with a case study [38] that focuses on peasant families' entrepreneurial behavior during the COVID-19 pandemic. The case study in this study will look at the process, action, or interaction formed by the views of a number of key respondents. Therefore, it will be used to find entrepreneurial literacy theory among farmers in North Morowali Regency. This regency was chosen as the research location because it was one of the agricultural bases in the Central Sulawesi Province (Indonesia). The agricultural industry with various agricultural commodities increased in this region, such as food crops and plantations. The primary agricultural commodities cultivated for generations by most peasant families included lowland rice, cocoa, and oil palm. Therefore, it is necessary to understand entrepreneurial behavior, which also explains how the peasant families acquire, adopt and apply agricultural knowledge.

Following the standard qualitative method, data were obtained using observation techniques and in-depth interviews with 6 peasants as the key respondents of the research. Judgment sampling was used to determine the key respondents with the following conditions: they should be peasants who had their private agricultural land, had more than five years of farming experience, and experienced the socio-economic impact of the COVID-19 pandemic. The key respondents consisted of two lowland rice peasants, two cocoa peasants, and 2 oil palm peasants.

Initially, the research site had 8 respondents and several incidental sources/ respondents. However, the other 2 respondents were found to be information saturated during interviews and observations. As a result, we decided to only interview 6 key respondents. Despite the fact that there were only 6 respondents, we concentrated on the findings, field facts, the process of literacy formation, and literacy practice. Previous empirical studies have also made generalizations about other types of literacy [13–15,19,20,23,25–28]. As a result, the results of our study can theoretically be generalized.

This research was conducted from December 2020 to March 2021, starting with observing the research area ranging from various phenomena of the development of the agricultural industry to entrepreneurial activities run by the peasants. The validity of the data collected through interviews was checked using the triangulation technique by comparing the information obtained from one informant with other respondents [38].

Triangulation in this research was carried out by examining evidence from data sources consisting of lowland rice farmers, cocoa farmers, and oil palm farmers and using them to build a coherent justification for themes. The triangulation method is done by comparing information in different ways, namely through observation and interviews. Researchers used different respondents to check the truth of each piece of information.

Our research also utilizes the Focus Group Discussion (FGD) to strengthen the findings. The invited FGD participants included 6 key respondents, 2 local civil servants from the agriculture office, 1 academic, 1 community leader, and 1 Non-Governmental Organization (NGO). The FGD was held in the meeting hall of North Mori District because it involved several parties and peasants from various villages. The FGD was already held for about two hours to confirm our previous findings. This FGD was conducted with the consent of all participants while adhering to health protocols to prevent the spread of COVID-19.

The qualitative research procedure for grounded theory case studies in this research refers to Creswell, which consists of (1) the problem formulation stage; (2) the theoretical study stage; (3) the stage of determining participant respondents; (4) the data analysis stage; and (5) the conclusion or report writing stage [39]. The researcher begins by identifying the research problem and then determines a good design to use when there is no theory to explain or understand the process. Next, the respondents were asked questions related to (1) “what is the process?” and (2) “how was it revealed?” Then the researcher explored again with more detailed questions to help in the axial coding stage. Data analysis gradually begins with open coding, then axial coding, and continues with selective coding. The final result of the process of data collection and data analysis is a theory, namely a substantial-level theory. The theory emerged from the memoing process.

#### 4. Results and Discussion

The results of this research indicate that agricultural entrepreneurship literacy was obtained from the internal and external environment. The capital was not only limited to finance and assets (traditional capital). It could also be knowledge, understanding, experience, and skills (human capital) [40]. Sources and forms of agricultural entrepreneurship literacy owned by the peasant families can be seen in Table 1.

Our results show that dynamic social and economic changes affected the entrepreneurial behavior of peasant families. The changes in the socio-economic environment during the COVID-19 pandemic specifically encouraged the peasants to take the decision to manage their agricultural businesses. Peasants must be able to make decisions on the use of quality seeds and seedlings. Then make decisions and implement strategies to overcome the problems of pests and plant diseases, scarcity and increase in prices of agricultural production facilities (fertilizers, pesticides, agricultural technology), and problems of access to agricultural output markets. The interaction of peasants in a changing climate, such as the uncertainty of rainfall intensity, also leads them to adjust their behavior towards cultivation patterns. This result is in line with Mashizha’s findings in dealing with problems such as climate change, and farmers will apply various strategies to maintain their economy [11]. In this condition, they were encouraged to respond or react according to their knowledge and understanding. At this time, the COVID-19 pandemic was the external factor that influenced the changes in the behavior of the world community [41].

Although they were still living amid significant socio-economic changes due to the COVID-19 pandemic, as the primary source of income, they aimed to produce the outputs that could be marketed to earn income to maintain the family economy. Haas et al. revealed that the dependence on the agricultural sector as the main source of income made most peasants unable to work from home, ultimately reducing mobility and various activities outside the home [41,42]. The results of this research are supported by Forsido et al. [10]. They revealed that the restrictions on mobility due to the COVID-19 pandemic impacted the aspects of agricultural products, such as the availability of production inputs (labor, fuel, agricultural extensions, fertilizers, pesticides, and access to capital resources).

The development of the agricultural sector and the increase in agricultural entrepreneurship literacy affected the behavior of peasants in the agricultural business. However, the peasant families had had values that had been believed for a long time. One of them was the “pranata mangsa” value system or planting season calendar believed by traditional communities and some peasants in today’s modern era. According to community leaders and other FGD participants, “pranata mangsa” is local wisdom that peasants have passed down from generation to generation, and that is still relevant based on evidence of farming practices on agricultural land. The belief in the value of “pranata mangsa” encouraged the peasants to adopt and apply the system in agricultural business management. The results explain that the planting calendar’s application effectively encouraged simultaneous planting behavior for groups of lowland rice peasants. These concurrent planting steps would encourage the peasants to simultaneously carry out the fertilization process, clean weeds, and eradicate pests and plant diseases. This method was effective in breaking the

chain of the spread of pests and plant diseases. The case shows that the social environment aspect of the community played a role in determining the behavior of peasants towards agricultural businesses. This research also strengthens the findings of Sumane et al. that local knowledge was a valuable resource that could direct modern agriculture on the path of sustainable and resilient agricultural development [25].

**Table 1.** Sources, processes, and forms of entrepreneurial literacy for the peasant family.

<b>Agricultural Entrepreneurship Literacy</b>	
Cultivation, quality seeds and seedlings, plant pests and diseases, fertilizers, pesticides, agricultural technology, and post-harvest management.	
<b>Internal Source</b> 1. Parents 2. Personal Experience	<b>External Source</b> 1. Education, 2. Other peasants, 3. Agricultural manuals, 4. Agricultural socialization, 5. Extension Worker, 6. Agricultural magazines, 7. Agricultural calendars, 8. Internet, 9. Community culture, 10. Buyers of agricultural products, 11. Sellers of production facilities, 12. Rules for use on packaging of seeds, fertilizers, or pesticides.
<b>Entrepreneurial Literacy Development Process From Internal Sources</b> <ul style="list-style-type: none"> <li>Get involved in the farm management with parents; Parents explain and give examples of lowland rice, cocoa, or oil palm cultivation.</li> <li>Peasants observe the characteristics of pests and plant diseases on agricultural land.</li> <li>See and analyze directly the effectiveness of pesticides used on agricultural land.</li> <li>View and analyze the impact of applying agricultural technology on agricultural land.</li> <li>Look for information about the agricultural commodity prices to buyers of agricultural products.</li> </ul>	<b>Entrepreneurial Literacy Development Process From External Sources</b> <ul style="list-style-type: none"> <li>Own, study, and rely on the community culture, such as the planting season calendar (pranata mangsa), to determine the time to plant.</li> <li>Knowledge acquired through formal education.</li> <li>View and analyze other peasants' agricultural processing practices (such as using various agricultural technologies).</li> <li>Ask and discuss with other peasants about types of seeds, plant pests and diseases, eradication of plant pests and diseases, types and benefits of fertilizers, types and benefits of pesticides, utilization of agricultural technology, and market access, etc.</li> <li>Follow and listen to the agricultural socialization from the extension worker, agriculture office, and other related parties.</li> <li>Read agricultural manuals, agricultural magazines, and agricultural calendars.</li> <li>Access various agricultural information via the internet using a smartphone.</li> <li>Discuss with sellers of agricultural production facilities about types of seeds, fertilizers, and pesticides.</li> <li>Read the use rules for packaging seeds, fertilizers, or pesticides.</li> </ul>
<b>Form of Entrepreneurial Literacy of Peasants</b> Knowledge and understanding of: <ol style="list-style-type: none"> <li>Cultivating agricultural commodities (lowland rice, cocoa, or oil palm).</li> <li>Types of quality seeds.</li> <li>Types of plant pests and diseases.</li> <li>How to eradicate and prevent plant pests and diseases.</li> <li>Types of fertilizers and pesticides.</li> <li>How to apply fertilizers and pesticides.</li> <li>Agricultural technology and how to use it.</li> <li>Post-harvest management.</li> <li>Market access.</li> </ol>	

Disclosure of information that caused increased knowledge affected changing the behavior of peasants. This could be seen from the behavior of peasants towards quality seeds. For generations, the cocoa peasant families had cultivated the local seeds (seedlings from parent trees), although they did not know the quality and advantages of these seeds



for sure. The peasants obtained and adopted the method of selecting seeds from the internal environment (previous generations). This finding is supported by Sumane et al., who stated that the peasants' initial knowledge was obtained from their parents and grandparents. The information disclosure increased knowledge and understanding and shifted peasants' behavior towards the types of seeds. Based on FGD results, the peasants were more convinced that the seeds provided by the government had a higher quality than the local seeds obtained from the previous generations. The local civil servants stated that they are continuously working to increase the distribution of subsidized quality seeds to the community. Therefore, most peasant families rejuvenated with a new planting system or an entry system using the seeds from the government or related agencies [25]. The finding of the importance of information in increasing literacy and changing farmer behavior has supported previous research from Rengganata et al. and Murwanashyaka et al., which found that from information literacy, farmers gained new knowledge and how to implement agricultural modernization and agricultural technology [14,29]. Further, the results of this research are also in line with the research of Matous and Todo, that new information obtained by the peasant families from the external environment was combined with the internal knowledge and adapted locally by the peasant families [35].

In addition to the cocoa peasants, the oil palm peasants also built almost the same assumption that all oil palm seeds were suitable for cultivation. This assumption made them cultivate seeds that were not from reliable sources. This behavior showed that most peasants did not have a good enough understanding of the types of seeds. Knowledge of seed quality increased when the peasants had field experience, especially in oil palm growth and production. The peasants could distinguish between types and sources of high- and low-quality seeds. The ability to understand and analyze types of seeds enabled the peasants to reject the notion that all types of seeds were suitable for cultivation. The peasants showed follow-up actions from this understanding by replacing oil palm plants that did not produce well with seeds from trusted sources, namely oil palm plantation companies. Farming knowledge that came from experience (observation and experimentation) was one of the important aspects of agricultural entrepreneurship [25,35].

The internal experience and external literacy encouraged a behavioral change in agricultural entrepreneurship. Transfer of knowledge and understanding from the environment changed the traditional behavior (how to move crops in lowland rice farming) based on agricultural technology. Machine technology (blower) sowing seeds replaced the manual transplanting system. The use of technology encouraged efficiency and optimal yields compared to the traditional transplanting method in lowland rice farming. The results of this research support Sumane et al., who stated that the peasants tended to adopt external ideas and practices that other peasants had successfully practiced [25].

Furthermore, plant treatment could affect the success of peasants in the agricultural business. It could be seen from the peasants' attitude in facing challenges such as decreased production, pests, and plant diseases. The cocoa peasants in the North Morowali district could not avoid the fact that the cocoa plants were old, so the production tended to decline. In this condition, they understood that it would impact their income (decrease). Therefore, they took anticipatory steps by rejuvenating the plants. The rejuvenation was carried out in two ways: new planting and rejuvenation by side grafting or cuttings. Most cocoa peasants chose rejuvenation by cuttings. This method was selected to avoid losing the primary source of income compared to the new planting method.

Another aspect that caused the decline in agricultural production was pests and plant diseases. The standard method of eradicating them was by spraying pesticides. The internal and external environment helped the peasants increase their knowledge and understanding of the application of pesticides. The socialization by extension workers and instructions for use on pesticide packaging could reduce the risk of using excessive doses for plants. Based on the arguments of local civil servants, academics, and environmental NGOs during the FGD, excessive pesticides could cause immunity to pests and plant diseases. Therefore, they no longer have a significant effect over time. The peasants' adherence to

agricultural socialization and the rules of pesticide packaging made eradicating plant pests and diseases run efficiently. It confirmed several researchers [21,25,27,35,37] who claimed that the extensions and training were important factors in shaping the peasants' knowledge and understanding. The implications of pesticide use behavior can be seen in Table 2.

**Table 2.** Types, spraying volume, and cost of pesticide for peasants per year.

Informant	Type of Pesticide	Spraying Intensity	Pesticide Volume	Volume	Unit Price	Spraying Cost	Total Cost of Pesticide
BA	Alika	8	5	40	US\$4.86	US\$24.31	US\$194.47
SA	Alika	8	1	8	US\$17.36	US\$17.36	US\$138.91
JL	Ziflo, Spontan	6	1	6	US\$9.03	US\$9.03	US\$54.17
MM	Dharmabas, Cypermax	6	1	6	US\$7.99	US\$7.99	US\$47.92
HT	-	-	-	-	-	-	-
MU	Sidametrin	1	1	1	US\$2.43	US\$2.43	US\$2.43

Source: Primary data.

Table 2 displays the types of pesticide used by peasants, spraying intensity, the volume of pesticides and costs incurred by peasants in one spraying, and the total pesticide cost per year. The costs incurred by the cocoa peasants were more than three times the pesticide costs required by the lowland rice and oil palm peasants. This considerable difference was influenced by massive and complex attacks of pests and plant diseases. These conditions also encouraged the intensity of spraying and the need for high cocoa pesticides.

Compared to the cocoa peasants (BA and SA), pesticide use in lowland rice farming (JL and MM) is lower. It is similar to the oil palm peasants (HT and MU), who have almost no expenditure on pesticides. In general, the oil palm peasants did not experience massive pest attacks, so they did not require intensive pest management. As for the invasion of pests such as fireworms (leaf-eating), there were only casuistic occurrences per oil palm tree.

Most cocoa peasants knew several alternative methods of eradicating plant pests and diseases. One of them was through a sanitation system for the remaining cocoa harvest. However, this entrepreneurship literacy did not impact changes in the peasants' behavior. Although literacy was positive, in reality, the peasants refused to use it. This attitude was based on the efficiency that could not be achieved because controlling pests with the sanitation system required time, effort, and considerable cost compared to spraying pesticides.

Applying fertilizer was another way to overcome the decline in agricultural production, control pests, and rejuvenate the plants. The land area and the peasant family's financial capacity determined the fertilizer application on the agricultural land—either for the lowland rice, cocoa, or oil palm tree. In addition to the financial ability, the dependence of peasants on soil fertility and the availability of fertilizers in the market also affected the application of fertilizers on agricultural land.

Although the peasants understood situations well, they did not always directly apply this understanding. Both internal and external factors could affect each peasant's behavior in the agricultural business. The application of fertilizer by the oil palm peasants could be an example. The internal factor that became a barrier for peasants to apply their understanding was the limited fund. It was an obstacle for the peasants to meet their fertilizer needs, especially the 4R criteria (right type, dose, time, and method). The recommended frequency of fertilization was twice or thrice a year. However, they could only be done twice or even once a year. In addition, the traditional knowledge that depended on soil fertility had also impacted the peasants' application of fertilizers on agricultural land. The peasants in this group only fertilized the land once a year. They would wait until the cocoa production decreased to carry out the fertilization process.

In addition to the internal factors, the external factors could also influence the peasants in implementing their understanding. One of them was the availability and price of fertilizer. During the FGD, the six key respondents agreed that the scarcity of fertilizer and the price that tended to be high caused the peasants to delay the fertilization process.

Similarly, the local civil servants argued that it could slow fertilizer distribution and increase scarcity and fertilizer prices. Therefore, the peasants in rural areas experienced delays in the fertilization process which then caused a decrease in the production and income from the agricultural businesses.

Our results confirm the findings by Dev and Sengupta [2]. They found that the impact of restrictions across regions and countries disrupted the distribution process in almost all sectors, including the inputs and outputs of the agricultural sector. The disruption of trade mechanisms causing shortages of fertilizers, lack of veterinarians, medicine supply, and other inputs could also affect agricultural production. Similarly, Forsido et al. found that the mobility restrictions due to COVID-19 in Ethiopia had led to a decrease in the availability and delayed distribution of agricultural inputs (fertilizers, quality seeds, fodder, and pesticides) to peasants [10]. This resulted in decreased agricultural production and productivity, increased input prices, and food insecurity. The types, volume, and cost of fertilizer for peasants per year can be seen in Table 3.

**Table 3.** Types, volume, and cost of fertilizer for peasants per year.

Informant	Type of Fertilizer	Fertilization Intensity	Fertilizer Volume			Cost/Type of Fertilizer			Total Cost of Fertilizer
BA	NPK, Dolomit	1	12	17		US\$112.51	US\$76.75	US\$189.26	
SA	NPK	1	20			US\$187.52	US\$0	US\$187.52	
JL	Urea, SP36	2	16	2		US\$122.24	US\$17.36	US\$139.60	
MM	Petorganik, NPK, Urea	2	26	8	4	US\$63.20	US\$75.01	US\$30.56	US\$168.77
HT	Urea, Petorganik	2	10	20		US\$69.45	US\$62.51	US\$131.96	
MU	NPK, ZA	2	56	28		US\$486.17	US\$155.58	US\$641.75	

Source: Primary data.

To anticipate the scarcity of chemical fertilizers and reduce the cost, the peasants were willing to apply new types of fertilizers, such as Petorganik fertilizers. Although they did not have sufficient knowledge and experience, the scarcity and high price of chemical fertilizers forced them to apply the Petorganik fertilizer. This behavior showed that the peasants were willing to take risks. One aspect of entrepreneurship was a willingness to take risks [17,18,20,30]. The production cost per year can be found in Table 4.

**Table 4.** The production cost of agricultural business per year.

Informant	Production Cost				Total Cost
	Fertilizer	Eradication of Weed	Pesticide	Labor Wages	
BA	US\$189.26	US\$72.23	US\$194.47	US\$569.52	US\$1025.48
SA	US\$187.52	US\$69.45	US\$194.47	US\$208.36	US\$659.81
JL	US\$139.60	US\$62.51	US\$54.17	US\$220.86	US\$477.14
MM	US\$168.77	US\$27.09	US\$47.92	US\$275.04	US\$518.82
HT	US\$131.96	US\$29.17	-	US\$23.61	US\$184.75
MU	US\$641.75	US\$162.52	US\$2.43	US\$2583.67	US\$3390.37

Source: Primary data.

Table 4 presents the production cost incurred by the peasant families in their agricultural business. It can also be seen from the expense of each peasant family that their behavior towards the agricultural land determined the cost of agricultural production. Differences in the expenditure could be influenced by several factors such as land area, need for fertilizer, and complexity of pests and plant diseases. The average area of cocoa plantations is 2 ha (BA and SA), rice fields area of 1–1.5 ha (JL and MM), and oil palm plantations of 4–9 ha (HT and MU). The differences in plantation areas affected the peasants' expenditure on fertilizers, cleaning weeds, pesticides, and the use of labor.

In addition to fertilizers, cleaning weeds, and pesticides, one of the production inputs that required a significant expenditure was the labor costs. The long chain of cocoa production and the need for skilled workers in the palm oil production process made the expenditure of labor wages high, such as BA and MU, whose spending on labor reached US\$569.52 and US\$2583.67 per year. This high cost was because almost all production processes (pest spraying, fertilization, weed removal, pruning, and harvesting) involved labor outside the family. The results indicate that the knowledge and skills of several peasant families regarding the agricultural production process were still relatively low. To cover this lack of knowledge, the peasants used skilled workers (both active and former) to carry out irrigation, digging, planting holes, and planting. However, it was in contrast to research by Deaton and Deaton, which found that restrictions on community mobility by tightening and even closing the territorial boundaries between regions impacted the availability of labor, especially for sectors requiring skilled workers [9]. In addition, Forsido et al. also explained the short-term effects of COVID-19, which could lead to labor shortages; the free movement of seasonal workers, which might significantly impact crop and livestock production [10].

Several peasant families implemented strategies. The reduction in labor was not because of social restrictions due to the COVID-19 pandemic but to reduce labor expenditure. The decline in labor encouraged the peasants to work with other family members to spray pests, fertilize, and clean weeds. Thus, this behavior of involving family members on agricultural land could reduce the cost of labor. The workers from within the family included school-age children who returned home from the city due to the fear of a pandemic despite the high risk of spreading COVID-19 to the family and the need for food in each family, which would tend to be higher [10].

To earn income, the output of agricultural commodities was marketed by the peasants. In contrast to the research by Forsido et al., Dev, and Sengupta [2,10], the results show that the access to marketing the agricultural output during the COVID-19 pandemic in rural areas almost did not encounter any obstacles. Rice as a staple food had an extensive market, and the selling price tended to increase. Although it did not increase significantly, marketing the other two commodities (dried cocoa beans and palm oil fresh fruit bunches) also did not experience serious problems. The cocoa peasants quickly sold their agricultural products to local collectors in the local village. Likewise, the fresh fruit bunches of oil palm peasants were directly sold to the collectors on plantation land. Below, Table 5 shows the calculations using a simple income formula which indicates that even during the COVID-19 pandemic, the peasants' income was still relatively high. Farming income (cocoa, rice fields, and oil palm) was higher than mushroom farmers' income in Jember, Indonesia, when compared to other farmers [14].

**Table 5.** Net income of farming per year.

Informant	Land Area	Quantity	Price	Total Revenue	Total Cost	Income
BA	2	2500	US\$1.98	US\$4948.55	US\$1025.48	US\$3923.07
SA	2	2200	US\$1.98	US\$4354.73	US\$659.81	US\$3694.92
JL	1	7000	US\$0.60	US\$4181.09	US\$477.14	US\$3703.95
MM	1.5	7000	US\$0.60	US\$4181.09	US\$518.82	US\$3662.28
HT	4	84,000	US\$0.04	US\$3208.75	US\$184.75	US\$3024
MU	9	240,000	US\$0.04	US\$9167.84	US\$3390.37	US\$5777.48

Source: Primary data.

The results show that the high income of peasant families in rural areas of North Morowali, Central Sulawesi Province, could guarantee the economic sustainability of peasant families. In addition to meeting the costs of agricultural production, it could also guarantee the consumption needs of peasant families. The results differ from Deaton and Deaton, which predicted that several peasant families would suffer from illness and

loss of productivity due to the COVID-19 pandemic. Their concern continued about the availability of capital to the peasants to support the agricultural business [9].

In addition, this research also shows that the COVID-19 pandemic did not significantly impact the entrepreneurial behavior and the income of rural peasant families. During the FGD, the six key respondents openly stated that, during the COVID-19 pandemic, they were still carrying out production activities as usual. This finding supports the results of Lopes et al., who found that the COVID-19 pandemic did not have a negative effect. During the COVID-19 pandemic, entrepreneurs actually feel challenged to seize opportunities and develop entrepreneurial activity [23]. It is also proven through the results that agricultural entrepreneurial activity continues, and business income shows sustainability. Several factors were the low population density in the rural areas compared to urban areas, the limited mobility of peasants to minimize social contact, local villagers' agricultural workers, and the commodities cultivated were crops and plantation commodities. This finding is in contrast to Chipenda, who found that agricultural production activities, planning, marketing, income-generating activities, and asset accumulation were actually significantly affected by the COVID-19 pandemic [12].

### 5. Theoretical Contribution

This research makes an important theoretical contribution because it examines entrepreneurial literacy from both an internal and external field perspective. This research can reveal how farmers develop agricultural entrepreneurial literacy, forming entrepreneurial literacy. So far, no other comprehensive study has been discovered that discusses the process of creating entrepreneurial literacy, the process of entrepreneurial literacy practice, and the performance outcomes of entrepreneurial literacy practice, all at the same time. As a result, these findings broaden the scope of Sokoya et al.'s previous research, which focused solely on the sources of farmer entrepreneurship literacy from extension and training programs [13]. Similarly, Rengganata et al. examine how information and technological literacy are practiced in one agricultural commodity [14]. Our findings connect the concepts of agricultural entrepreneurial literacy developed by Clemons et al. and entrepreneurship developed by Khazaeli et al. and Eriksson et al. [15–17]. Therefore, agricultural entrepreneurship literacy is the application of knowledge and understanding to the practice of agricultural entrepreneurship systems.

Furthermore, this research develops a simple model of the literacy and entrepreneurial behavior of peasants during the COVID-19 pandemic. This model explains that entrepreneurial literacy is obtained from the internal environment and the external socio-economic environment. Figure 1 explains the literacy and entrepreneurial behavior model.

Entrepreneurial literacy starts with cultivation systems, quality seeds, pests and plant diseases, fertilizer, pesticides, agricultural technology, post-harvest management, and market access. In addition, entrepreneurial literacy affects the entrepreneurial behavior of peasant families, which in turn encourages their economic sustainability. The entrepreneurial process of peasant families is influenced by the human capital owned by the family, including knowledge, understanding, experience, and skills.

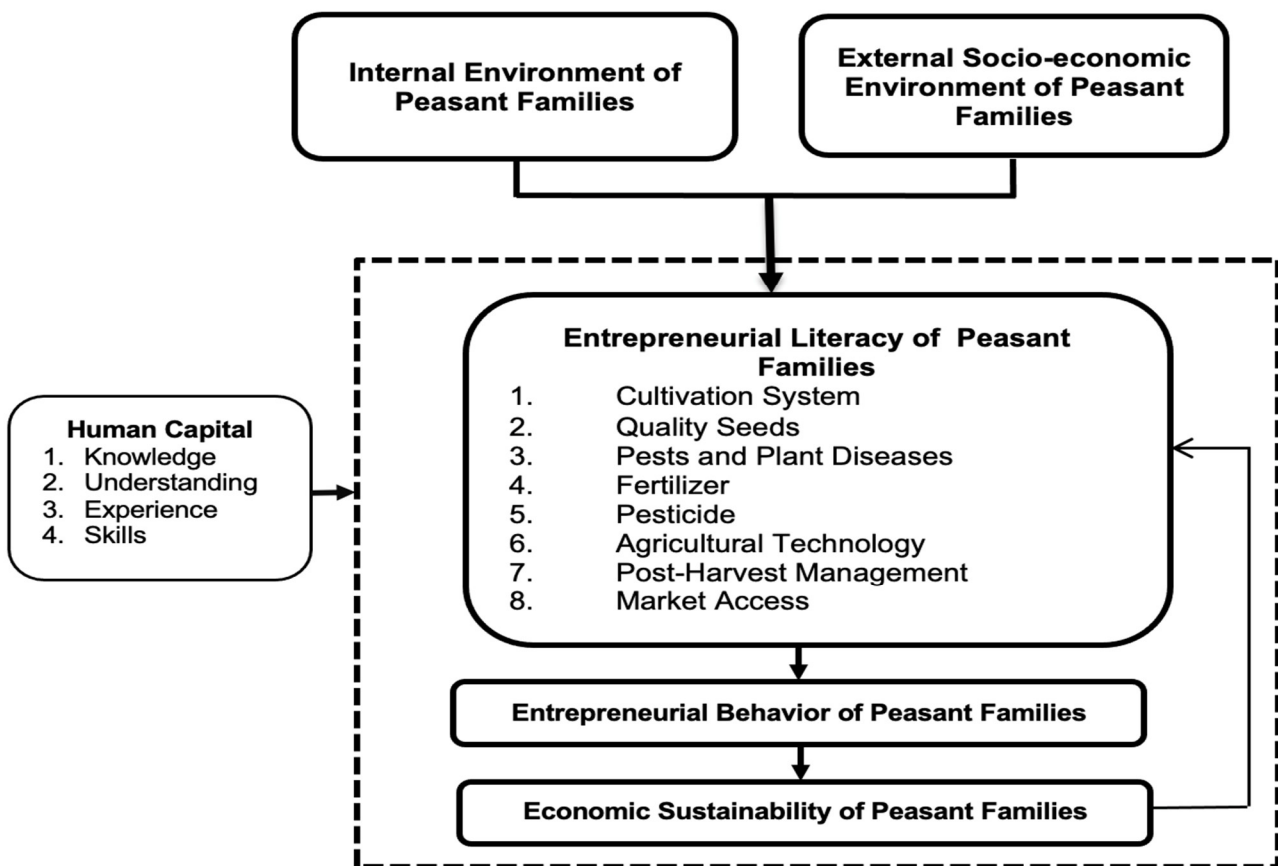


Figure 1. Literacy and entrepreneurial behavior model of peasant families.

## 6. Conclusions

Despite the socio-economic restrictions due to the COVID-19 pandemic, peasant families in rural areas continued to participate in agricultural entrepreneurship. The entrepreneurship activities were guided by the entrepreneurial literacy obtained from the interaction process with the internal and external environment even before the COVID-19 pandemic started. Agricultural entrepreneurial literacy refers to human capital (knowledge, understanding, experience, and skills) consisting of cultivation systems, quality seeds, pests, plant diseases, fertilizer, pesticides, agricultural technology, post-harvest management, and market access.

Further, the results also show that the impact of the COVID-19 pandemic on the entrepreneurial behavior of peasants in rural areas tended to be insignificant so that the peasant families could still carry out the production process of agricultural commodities (lowland rice, cocoa, and oil palm). In addition, this research finds that the income of peasants in rural areas was still relatively high, so they could support the capital of business production while still meeting consumption needs. This research reveals the importance of entrepreneurial literacy in the agricultural sector for peasant families. This literacy was considered important because it was a guideline for the peasant families to manage their agricultural businesses to obtain high productivity and a high income. This has implications for government policies to improve agricultural entrepreneurship literacy through intensive counseling and assistance to farmers. Not only the government but the role of university academics in economics and agriculture is also needed through counseling, training, and mentoring to improve the entrepreneurial literacy of rural peasants [43]. Thus, sustainable literacy and entrepreneurial behavior will be created in the community

Several aspects can influence the low impact of the COVID-19 pandemic in rural areas. For instance, the low population density compared to urban areas limited peasants' mobility to minimize social contact, and the commodities cultivated in rural areas were

food commodities. This research succeeded in answering the challenge of Lopes et al. to conduct research outside the context of student entrepreneurial interests [23]. This research has taken part in the contest of literacy and agricultural entrepreneurial behavior. However, this research has several limitations. First, there was a short time between the confirmation of the first COVID-19 case in Indonesia in March 2020 with the beginning research period, which resulted in an insignificant effect of the pandemic in the rural areas. Second, this research only analyzes the entrepreneurial behavior in entrepreneurial literacy and its application in agricultural land. Therefore, there is a need for further investigation and long-term research concerning peasant families' socio-economic relations and positive psychology during the COVID-19 pandemic. Third, the scope of observations in this study is still limited to the province of Central Sulawesi. So, it is important for further research to expand the research sample (e.g., several rural areas in Indonesia). Fourth, the Delphi method could be used in future research to gather the opinions of a larger number of entrepreneurs from other regions of Indonesia. The Delphi study technique could validate the consensus-based results.

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