

## Institutional sustainability strategy of farmers in red onion farming

Asriyanti Syarif\* and Rasdiana Mudatsir

Makassar Muhammadiyah University, Indonesia

\*Corresponding author's e-mail: Asriyanti.syarif@unismuh.ac.id

Received March 6th, 2023; revised April 17th, 2023; accepted April 26th, 2023

### ABSTRACT

Farmer participation will continue to be sustainable, so an institutional sustainability strategy is needed to develop agriculture as a support for the Indonesian economy. This study took informants from farmer groups and extension agents which were carried out purposively. Data collection was carried out by conducting in-depth interviews through the FGD (Focus Group Discussion) mechanism. Data analysis was carried out in a qualitative descriptive manner to answer the institutional goals of support and participation while the sustainability strategy was carried out by adopting a variant of Brinkerhoff's theory of sustainability strategy. Supporting institutions in red onion farming are farmer groups and extension workers who synergize with each other. Participation of group members: decision making and technological innovation by 40%, providing advice and input by 80% and utilizing local wisdom by 100%. The mechanical sustainability strategy follows group procedures based on SOPs and is active in the process. Adaptive strategy by providing knowledge about the impact of climate change. Interactive strategy by providing input on sustainable agriculture such as: the use of organic fertilizers. While the reactive strategy is carried out by using technology from innovation and the adoption process.

### Keywords:

Farmer institutions, Participation, Sustainability strategy

## 1. Introduction

Red onion is a superior product from horticulture which has high economic value as a cooking spice or spice which cannot be substituted [1]. The active compounds in red onion bulbs play a role in neutralizing harmful toxic substances and helping to remove them from the body. It has the potential to be developed because it is agro-climatologically suitable for cultivation in Indonesia, especially in the highlands. Efforts are needed to increase production in meeting community needs (household and industrial consumption). According to Sumarni et al. [2], production can be increased by means of intensification or extensification. With an increase in production, it is hoped that there will be a decrease in the volume of imports [3].

South Sulawesi has great agro-climatological potential for onion and shallot farming in Indonesia, this is evidenced by the production in 2018 of 92,392 tons, in 2019 of 101,762 tons, in 2020 of 124,381 tons, and in 2021 of 183,210 tons [4]. Shallot production from South Sulawesi has increased over a period of four years (2018-2020), including in Gowa Regency, production in 2018 was 717 quintals, in 2019 it was 995 quintals, in 2020 it was 1,492 quintals and in 2021 it was 2,635 quintals [5], there has been an increase in production during 2018-2021, especially in 2021. The increase in production in Gowa Regency cannot be separated from regional support, farmer involvement, technological innovation, and development efforts, including in the Tombolopao District. The red onion development area in addition to vegetable crops in Gowa Regency, which has an altitude of 1,000 meters above sea level and is 106 km away [4] involves farmers as managers and also potential workers, requires the



existence of supporting farmer institutions to obtain production facilities, technology package. There are problems from climate change, so that it is difficult for farmers to avoid the risk of damaged crops. They need support to get assistance with means to deal with the risks of pests and diseases as well as crops that are sold in cheap conditions. The conditions experienced by farmers are reinforced by Putera et al. [5], that the weak bargaining position of farmers in obtaining assistance with facilities and infrastructure as well as offering yields is what farmers often encounter due to their limited resources, including human resource capabilities. Farmers in carrying out farming activities must allocate natural resources effectively [6], in order to achieve this goal input, suggestions and cooperation with other farmers are needed in farmer groups. Therefore, it is necessary to strengthen farmer institutions by developing strategies.

Strategy is an effort made by a group to survive and be sustainable by strengthening capital to carry out farming, making efforts to improve production quality and strengthening cooperation between existing institutions within the scope of farmers [7]. Strengthening farmers is carried out by presenting institutions consisting of farmer groups, agricultural commodity associations, a combination of farmer groups with the term Gapoktan and the Indonesian agricultural commodity council which seeks to defend the interests of farmers [8]. Farmer institutions are greatly supported by increasing the institutional capacity of farmers which can be carried out through counseling and intensive assistance from relevant agencies [9]. The institutional sustainability of red onion farmers must be supported by strengthening by overcoming the problems faced by farmers, providing guarantees for sustainability in efforts to provide knowledge and technology that supports farmers to be able to compete and improve farmers' welfare [10]. The application of effective and efficient innovations carried out by extension workers as part of institutions through farmer groups encourages the development of development in the village [11].

Previous research conducted by Akbar et al. [14]. states that strengthening farmer institutions seeks to strengthen institutional positions in the form of coordination between institutions as a step to empower farmers by using SWOT analysis as a strategy, has revealed institutions in the field of horticulture, but has not broken-down institutions that focus on red onion. Research conducted previously illustrates that institutional sustainability requires a strategy using SWOT analysis [13], providing opportunities for the use of other strategies with a variant of the strategy from *Briengkerhoff*. The sustainability of farmer institutions is strengthened by capacity building by carrying out activities that motivate farmers to be able to take part in extension activities in order to increase individual capacity. Extension activities that provide content to increase individual capacity [14], but do not yet describe the forms of supporting institutions. Farmer institutional sustainability efforts are important, according to Humaidi et al. [17], a strategy was developed using SWOT analysis and QSPM, but did not elaborate on farmer participation as the key to institutional strengthening. According to research conducted by Leite [18], institutional strengthening requires public and private collaboration and individuals can become facilitators. This research provides an opportunity to see farmers synergizing with members of farmer groups and extension workers. The objectives of conducting this research are analyzing institutions that support red onion, analyzing farmer participation in farmer groups as a form of strengthening farmer institutions, and developing sustainability strategies.

## 2. Methods

This research used informants who were carried out intentionally in the Parang Lompoa Farmer Group as many as 10 people who were administrators consisting of: chairman, secretary, 6 other administrators and 4 members, and 1 agricultural extension worker. So that the total number of informants used was 11 people. This is done by carrying out observations, in-depth interviews with FGD (focus group discussion) mechanisms at farmer institutions in red onion and documentation. Analysis of the data used in supporting institutions for red onion is descriptive with indicators: participation, productive activities, establishment and development of institutions, introductions, use of technology, and roles and strategies carried out by extension workers. Group participation was also analyzed descriptively using percentages to measure the level of participation in decision making, giving advice and input, and using local wisdom. Meanwhile, the sustainability strategy uses a variant of the sustainable strategy from Brinkerhoff's theoretical concept [17]. The strategy variants disclosed by *Briengkerhoff* provided in Table 1.

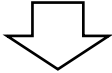
**Table 1. Variant of sustainability strategy**

<b>Mechanical Strategy</b>	<b>Adaptive Strategy</b>
More internal thinking (Referring to SOP)	Motivate the environment based on its internal patterns
Active in the process but not at all or very low in taking lessons from experience	Modification: done externally
Tendency: high performance but often short in general	For example: how many variations of shallots are available for processing where the institution selects according to environmental needs based on capacity.
Can survive if external conditions are stable	Sustainability trend is high, performance is moderate
<b>Reactive Strategy</b>	<b>Interactive Strategy</b>
Modifications are done internally	Have a smart institution
Reactive institutions in adapting to the environment, there are variations of onions to be processed by adapting appropriate technology	Searching for suitability
There is a tendency in high sustainable conditions, medium performance	Interact between the active reflective dimension with external-internal orientation into a complex mixture so that the most contingent choice is obtained
	Highly efficient, effective, highly innovative, and highly compatible with the environment
	Have a high sustainable tendency and supported by performance

Source: Brinkerhoff theory

The variance of the strategy to be implemented is strongly influenced by environmental factors both internally and externally. The description of the environment can be seen in Table 2.

**Table 2. External and internal environment in relation to the sustainability strategy**

Environment	
<p>Internal environment: Resources (in tangible and intangible form), Capability is the ability possessed by an organization/institution to coordinate or empower resources productively. Example: structure, process, and control system</p>	<p>External environment: Environmental function known as the Tax Environment (TE) which has a direct influence on the organization, due to factors that exist in internal and external conditions in this case: customers, competitors, suppliers, markets, and workforce.  General environmental conditions known as the General Environment (GE) are the outer layers of the external environment which indirectly influence the organization and management. These include sociocultural, economic, technological, political factors.</p>
<p>Contingent on sustainability:</p>  <p>Institutional ability to adapt to the demands of TE and GE</p>	

The conceptual framework built by *Bringkerhoff* is in the form of SCOPE which consists of: S which is a system in this case the input to the output that requires the process. CO is a contingency with the basic propositions: (a) There are no universal organizational principles that are appropriate for all situations; (b) The success of an organization depends on an adequate "fit" with its environment; (c) To achieve this "fit", an organization must have a structure, strategy, culture, P is an element of politics, business activities or economic activities which do not only involve individuals but are state affairs. E is an economic element, an economic institution (market, company) that requires political institutions (bureaucracy, legislature) so that it fulfills a parallel social function.

### 3. Results and Discussion

#### 3.1. Agricultural Institutions Supporting

##### 3.1.1. Farmer Group

Farmers in conducting farming must allocate natural resources effectively [18], in order to achieve this goal, farmers need advice, input and cooperation with other farmers in farmer groups. The Parang Lompao Farmer Group is a farmer group formed in the Tombolopao district with a management structure consisting of chairman, secretary, treasurer, and administrators with the following sections: (1). Farming, (2). Processing, (3). Marketing, (4). Microfinance as well as members. This

farmer group that focuses on horticulture includes red onion. This group was formed to fulfill the interests of farmer group members with a high level of participation as evidenced by their presence in counseling, demonstration plots, and comparative study activities to improve skills and knowledge. Productive activities are carried out under the direction of extension workers and assistance from group members. Institutional development is based on the concept of social capital with an emphasis on collaboration with group members to solve problems in red onion, as well as technological innovation. Institutional introductions simply involve institutions. Formation and institutional development in a top-down manner (from the direction of extension officers representing the Department of Agriculture to develop knowledge, technological innovation, and empowerment of farmers under the umbrella of farmer groups. Parang Lompoa Farmer Group have operational standards for carrying out group activities assisted and directed by agricultural extension workers.

The use of technology used is an appropriate technology that is simple in nature. Members of farmer groups are also included in training such as: training on the use of mulch and tools to support the operation of farmer groups. This training, according to Mahmood Nasir [18], helps a good understanding and improvement agricultural community. The use of the recommended tools is also the use of environmentally friendly technology for the sake of agricultural sustainability. In supporting the sustainable farming model, the group is directed to the use of organic fertilizers.

### 3.1.2. *Extension Worker*

A facilitator, teacher, motivator for farmers. The instructor has a Bachelor of Agriculture background who has devoted herself for 13 years. The intensity of counseling provided depends on the schedule of regular visits. Apply demonstration plot methods, face-to-face and group visits. The challenge faced in providing extension services is gathering farmers because the farmers' fields are far from the extension locations. The use of media used in counseling with the presentation of the use of LCD. The strategy provided helps solve the problems faced by farmers from infrastructure, farming to the marketing stage. This is in line with what was expressed by Amadu [21], that counseling facilitates innovation, consultation. Extension agents bridge farmers in providing facilities and infrastructure in terms of facilitating farmers with the government, helping farmers to get training packages, aiding farmers in fertilizing and efforts to maintain plants, harvest.

### 3.2. *Participation*

Participation is a person's activeness in an activity and in a group such as a farmer's group. According to Methamontri et al. [22], farmer participation in a farmer group is due to the experience of farming that has been carried out, as well as the economic benefits that have been felt. The forms of participation of farmer group members in red onion farming can be seen in Table 3.

Table 3 shows that the participation of farmers in groups for decision-making and technological innovation is still dominated by farmer group administrators in red onion farming. According to the farmers, the administrators regulate the use of seeds and other production facilities, but they can also provide input to the administrators. For them, what the group leader decides is what is best for the group's interests. They trust the group administrators because they are relatives and there is trust that is built

from a framework of social capital. This is also reinforced by the opinion Cusworth [23], that individuals will participate and entrust to groups because there is motivation built from social capital and a network of social contacts which are also part of the individual. Apart from that, farmers' decisions to participate in technological innovation are strongly influenced by the environment. According to Laksono et al. [24], external factors from the farmer's environment such as prominent people in their environment (extensionists, leaders from local government and religious leaders) and there are economic benefits.

**Table 3. Forms of participation in strengthening the institutional sustainability strategy**

Numb.	Form of Participation	Participation rate
1.	Engage participative in decision-making and technology innovation	40%
2.	Provide suggestions and input to farmer groups	80%
3.	Use of Local Wisdom	100%

The condition of shallots is easily damaged due to the influence of the weather with high rain intensity, price fluctuations and this commodity is easily attacked by pests and diseases. According to their testimony, the chairmen and administrators of the farmer groups usually provide advice and suggestions for solving problems. This is supported by the statement of Campos [25], that farmers basically participate voluntarily including in giving advice and in making rules.

The use of materials that are natural in nature and is a form of local wisdom in efforts to use materials in pest eradication and farming management techniques that tend to be traditional and use materials from the surrounding nature is a form of group member participation. Local wisdom is created because of the desire of farmers, according to Laksono et al. [24]. local wisdom practiced by farmers is strongly influenced by Indonesia's socio-demographic characteristics.

### 3.3. Sustainability Strategy

Sustainability strategies must be carried out in farmer institutions. In Sustainability, it contains the comfort of group members in their community, so that they can actualize themselves and can be active in the process [22]. The existence of a community such as farmer groups offers perspectives and strategies in the management and use of resources [26]. The existence of farmer groups was explained by one member of the farmer group informants as follows:

*"The existence of the group has helped with the method of spraying and planting the seeds. I was also included in the counseling activities carried out by the extension workers, especially when there are impacts arising from climate change because this is one of the reasons for considering planting shallots"* (TR, 33 years).

The description disclosed by the informant illustrates the importance of farmer groups facilitating them in technical guidance on the application of pesticide use and planting, providing information and strategies that keep them growing shallots in conditions of climate change by managing crop planting times and crop diversification [27].

Meanwhile, according to the informants interviewed, the existence of extension workers is as follows:

*"In addition to providing counseling as well as being a facilitator to obtain seeds from the government, it is enough for extension agents to provide counseling on the use of organic fertilizers and the use of mulch, but sometimes there are obstacles in plot demonstrations due to our difficulties in participating due to distance and time considerations"* (PR, 42 years).


The description presented by informants from farmer group members revealed that the extension worker had carried out his function properly in accordance with his role as a facilitator to obtain seeds, acting as a communicator in the use of technology even though there were obstacles and obstacles encountered in the implementation of extension. According to Owolabi et al. [28], the existence of extension workers has strengthened farmer group institutions, in the use of appropriate technology that improves decision-making processes and innovation choices. The existence of the role and empowerment of farmer groups and extension workers encourages the strengthening of farmer institutions besides that, according to Elizabeth [29], it encourages self-sufficiency and sustainability. The farmer institutional sustainability strategy in red onion farming can be shown in Table 4.

**Table 4. Sustainability strategy at the Parang Lompoa Farmer Group**

<b>Strategy Mechanical</b>	<b>Strategy Adaptive</b>
More internal thinking (Referring to SOP)	Providing knowledge to farmers to overcome the impact of climate change
Active in the process	
<b>Strategy Reactive</b>	<b>Strategy Interactive</b>
Using red onion variants that produce production with the use of technology	Teaching members of farmer groups the concept of sustainable agriculture in the farming of shallots and other crops with an intercropping system and management of organic waste into fertilizer
Perform internal modifications	

Regarding the picture of the environment internally and externally, it is shown in Table 5. The results of the strategy include the use of technology, adopting technology requires agricultural innovation that is built within an organization. According to Sjaif et al. [30], a group of people gather together by sharing knowledge, there are actors who play a role in creating creativity with the required capacity and are able to handle complexity in the process of implementing innovation. The role of administrators in farmer groups is very large in technological innovation, adopting and applying technology to groups. Farmer groups provide advice to their members to plant other crops besides shallots in order to maintain economic and environmental sustainability. This is also confirmed by the statement Santoso et al. [31], that the best land use is in farming with the application of an intercropping system.

**Table 5. Internal and external environment**

<b>Environment</b>	
<b>Internal environment</b>	<b>External Environment</b>
There is an allocation of human resources manifested in the organizational structure.	Competitors = red onion farmers in Bantaeng and Enrekang districts.
Management of natural resources by farming shallots and other types of vegetables in the production process.	Customers = those in the vicinity of Gowa Regency and Makassar Municipality.
Control is carried out by eradicating pests and diseases by applying pesticides and others.	Suppliers = are farmer stalls, and plant nurseries.
	Supported by extension agents who provide intensive counseling and farmer shops.
Contingent on sustainability:	
	
institutional ability to adapt to the demands of TE and GE	

Extension support to strengthen farmer institutions, by providing counseling although not intensive in conducting counseling for the development of technological innovations, aiding in horticultural type farming activities, especially shallots, provides the capacity of farmer group membership. The existence of institutional attributes: farmer groups, and extension workers by providing training assistance and others increases farmer confidence to carry out red onion activities and other business [32].

Adaptation strategies are needed by farmer groups to survive natural conditions such as climate change. According to Derbile et al. [33], climate change has consequences for small-scale farmers and their families, due to decreased production, damaged crop conditions. and high production costs as well as low purchasing power (macro conditions). For farmers, climate change has had an impact on the process of implementing farming and production. Therefore, farmer groups through group leaders direct group members to consult and communicate with agricultural extension workers. One form of effort made by farmers is by applying the use of compost, the use of superior seeds that are resistant to climate change and short-lived in the production process (harvest in a short time).

Modifications are needed for the sustainability of the organization, including in farmer groups. The modifications made in the group were changes in the organizational structure and modifications related to the implementation of the farming of shallots and other commodities (potatoes and carrots). Processing activities in groups are carried out with the participation of group members. Members actively participate in counseling, one of which is demonstration plots, are active in participating in group activities.

The system built by farmer groups in SCOPE strives for facilities or input from owned agricultural kiosks which are assistance programs, while CO adheres to three



propositions, while PE illustrates that the activities carried out by farmer groups are synergized with the bureaucracy (Agricultural Service and extension agents).

#### 4. Conclusion

Based on the results obtained in this research, it can be concluded as follows: (1) Institutions that support red onion farming are farmer groups that support members to participate, absorb technological innovations and are based on social capital. While extension workers carry out their functions as facilitators and motivators for farmers in providing facilities and infrastructure as well as solving problems related to farming; (2) Participation by group members in the form of participation in decision-making and technological innovation is 40%, providing advice and input is 80% and the use of local wisdom is 100%; and (3) The mechanical sustainability strategy follows group procedures based on SOPs and is active in the process. Adaptive strategy by providing knowledge of the impact of climate change. Interactive strategy by providing input on sustainable agriculture such as: the use of organic fertilizers. While the reactive strategy is carried out by using technology from innovation and the adoption process.

#### Acknowledgements

We express our deepest gratitude to the Central Muhammadiyah Research and Development Council for entrusting us with receiving grants with the Basic Research scheme in RisetMu Batch VI.

#### References

1. Kurnianingsih A, Susilawati, Sefrila M. Karakter pertumbuhan tanaman bawang merah pada berbagai komposisi media tanam. *J Hortik Indones*. 2018;9:167–73.
2. Sumarni N, Hidayat A. *Budidaya bawang merah*. Bandung: Balai Penelitian Tanaman Sayuran; 2005.
3. Tambunan WA, Sipayung R, Sitepu FE. Pertumbuhan dan produksi bawang merah (*Allium ascalonicum* L.) dengan pemberian pupuk hayati pada berbagai media tanam. *J Online Agroteknologi*. 2014;2:825–36.
4. BPS Provinsi Sulawesi Selatan. *Sulawesi Selatan in figures 2022*. Makassar; 2022.
5. Zulkifli UC. *Statistik daerah Kabupaten Gowa 2022*. Badan Pus. Stat. Kabupaten Gowa. Kabupaten Gowa; 2022.
6. Idhan A, Syamsia, Patappari A. Peningkatan produksi benih bawang merah berbasis kelompok tani di Desa Tabbijai Kecamatan Tombolopao Kabupaten Gowa Sulawesi Selatan. *Ngayah Maj Apl IPTEKS*. 2018;9:108–14.
7. Putera A, Madjid R, Mustamin H. Peningkatan kesejahteraan petani melalui strategi penguatan kelembagaan ekonomi di Kabupaten Konawe Utara. *J Agribisnis dan Sos Ekon Pertan*. 2015;1:58–70.
8. Maswad M, Beddu MA, Karim I, Putri DA, Suyono S. Farmer's stance on decreasing production of local red onion (*Allium cepa* L.) farming in Buttu Pamboang Village, Majene. *ANJORO Int J Agric Bus*. 2020;1:25–9.
9. Mardani D, Kusumah MS. The Farmer's strategy in maintaining the sustainability of organic farming in Rowosari Village, Jember Regency. *J Entitas Sociol*. 2018;7:61–70.

10. Handayani A. Implementasi program penguatan kelembagaan petani di Kecamatan Kledung Kabupaten Temanggung. *J Bhumi Phala*. 2020;1.
11. Muin N, Isnaini W. Kelembagaan petani sutera di Kabupaten Soppeng. *Bul Eboni*. 2018;15:41-52.
12. Yuniati S, Susilo D, Albayumi F. Penguatan kelembagaan dalam upaya meningkatkan kesejahteraan petani tebu. *Pros Semin Nas dan Call Pap Ekon dan Bisnis*. Jember; 2017. p. 498-505.
13. Arham I, Sjaf S, Darusman D. Strategi pembangunan pertanian berkelanjutan di pedesaan berbasis citra drone (studi kasus Desa Sukadamai Kabupaten Bogor). *J Ilmu Lingkungan*. 2019;17:245-55.
14. Akbar, Syarif A, Saleh MI, Jumiaty. Penguatan kelembagaan lokal dalam pengembangan agribisnis hortikultura di Kecamatan Uluere Kabupaten Bantaeng. *J Sos Ekon Pertan*. 2022;18:159-74.
15. Suryanawati, Aswad AJ. Strategi penguatan kelembagaan kelompok tani pada usahatani jagung pipilan Desa Penyandingan Kecamatan Sosoh Buay Rayap Kabupaten Ogan Komering Ulu. *Jasep*. 2019;5:10-24.
16. Anantanyu S. Kelembagaan petani: Peran dan strategi pengembangan kapasitasnya. *SEPA*. 2011;7:102-9.
17. Humaidi E, Asriani PS, Priyono BS. Strategi keberlanjutan agribisnis beras organik. *J AGRISEP Kaji Masal Sos Ekon Pertan dan Agribisnis*. 2021;20:207-26.
18. Leite E, Ingstrup MB. Individual strategies as interaction modes for handling institutional logic diversity over time: A case study on a public-private collaboration project. *Ind Mark Manag*. 2022;107:266-75.
19. Brinkerhoff DW, Goldsmith AA. *Institutional sustainability in agriculture and rural development: A global perspective*. New York: Praeger; 1990.
20. Mahmood N, Arshad M, Mehmood Y, Faisal Shahzad M, Kächele H. Farmers' perceptions and role of institutional arrangements in climate change adaptation: Insights from rainfed Pakistan. *Clim Risk Manag*. 2021;32:100288.
21. Amadu FO. Peer effects in agricultural extension: Evidence from community knowledge workers in rural Uganda. *Soc Sci Humanit Open*. 2023;7:100484.
22. Methamontri Y, Tsusaka TW, Zulfizar F, Yukongdi V, Datta A. Factors influencing participation in collective marketing through organic rice farmer groups in northeast Thailand. *Heliyon*. 2022;8:e11421.
23. Cusworth G. Falling short of being the 'good farmer': Losses of social and cultural capital incurred through environmental mismanagement, and the long-term impacts agri-environment scheme participation. *J Rural Stud*. 2020;75:164-73.
24. Laksono P, Irham, Mulyo JH, Suryantini A. Farmers' willingness to adopt geographical indication practice in Indonesia: A psycho behavioral analysis. *Heliyon*. 2022;8:e10178.
25. Campos BC. The Rules-Boundaries-Behaviours (RBB) framework for farmers' adoption decisions of sustainable agricultural practices. *J Rural Stud*. 2022;92:164-79.
26. Melash AA, Bogale AA, Migbaru AT, Chakilu GG, Percze A, Ábrahám ÉB, et al. Indigenous agricultural knowledge: A neglected human based resource for sustainable crop protection and production. *Heliyon*. 2023;9:e12978.
27. Wolka K, Uma T, Tofu DA. The role of integrated watershed management in climate change adaptation for small-scale farmers in Southwest Ethiopia. *Environ Sustain Indic*. 2023;19:100260.

28. Owolabi AO, Yekinni OT. Utilisation of information and communication technologies for agricultural extension service delivery in public and non-public organisations in southwestern Nigeria. *Heliyon*. 2022;8:e10676.
29. Elizabeth RG. Peningkatan partisipasi petani, pemberdayaan kelembagaan dan kearifan lokal mendukung ketahanan pangan berkelanjutan. *Agricore J Agribisnis dan Sos Ekon Pertan Unpad*. 2019;4:48-61.
30. Sjaf S, Arsyad AA, Mahardika AR, Gandi R, Elson L, Hakim L, et al. Partnership 4.0: smallholder farmer partnership solutions. *Heliyon*. 2022;8:e12012.
31. Santoso PB, Darwanto D. Strategy for strengthening farmer groups by institutional strengthening. *J Ekon Pembang Kaji Masal Ekon dan Pembang*. 2015;16:33-45.
32. Alemu T, Tolossa D, Senbeta F, Zeleke T. Household determinants of continued adoption of sustainable land management measures in central Ethiopia. *Heliyon*. 2023;9:e13946.
33. Derbile EK, Bonye SZ, Yiridomoh GY. Mapping vulnerability of smallholder agriculture in Africa: Vulnerability assessment of food crop farming and climate change adaptation in Ghana. *Environ Challenges*. 2022;8.