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Implementation of Good Agriculture Practice (GAP) in chili urban farming program: Evaluation on planting management in Manggala district City of Makassar

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Abstract. This study aims to obtain information about the application of the Standard Operational Procedure (SOP) for chili cultivation as part of the alley business entity program in Manggala District, Makassar City. The research location was determined based on the consideration that in that location there were several farmer groups that had been verified by the Food Security Service Office in several previous programs. This research used descriptive method by observing and interviewing eight sub-districts in Manggala District. The results show the level of application of the SOP for chili cultivation in Manggala District, Makassar City of 64.06% with the highest percentage in Tamangapa sub-district covering the level of application of chili cultivation, namely seeding (75%), planting (75%), maintenance (75%), and harvest (75%). Meanwhile, the lowest level of application was shown in Biring Romang, namely seeding (45%), planting (45%), maintenance (30%) and harvesting (30%). The highest chili production was achieved by the Tamangapa district (200 g / tree) categorized as successful, while the lowest chili production was in the Biring Romang sub-district (100 g / tree) with the less successful category. The most common problems faced by respondents were pests and diseases where the most common pests were mealy bugs and the most common disease, namely fusarium wilt.

1. Introduction

Makassar City as the capital city of South Sulawesi Province is not free from various problems, ranging from poverty due to lack of skills, cleanliness due to lack of awareness and security and many more. Therefore, to overcome various problems that arise in Makassar City, the Mayor of Makassar for the period 2014 - 2019 initiated the Alley Business Entity program called BULO. The BULO is a policy of the Mayor of Makassar initially inspired by the idea to change the face of the hallway to become more green, it is also shown in accordance with the Mayor's vision, namely to create a world city of Makassar supported by the appearance of the alleyways. In addition, one of the goals of the program is to make the city alleys to be more productive by planting chilies and vegetables to control or reduce inflation caused by chili prices when availability of this commodity is lacking in the community (Food Security Service, 2017).

The BULO program is a program that utilizes city corridors to be more productive. The hallways are arranged to be more beautiful, clean and green with vegetables and fruit and other plants. The 7,520 alley management model in Makassar City is a form of regional innovation through the BULO program



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that embraces alley communities to organize their Sub-districts by keeping each alley clean and residents are involved in planting trees and horticultural plants. The Lorong Business Entity started planting simultaneously in all districts, including planting 16,000 chili seeds in Manggala District.

Chili is a basic need that has been determined through Presidential Regulation Number 71 of 2015 concerning the determination and deviation of prices for basic necessities and essential goods. As one of the staple goods, the government is obliged to make efforts to ensure the availability and affordability of chili prices at all times. Seeing this, in 2009 the Makassar City government created the PK2KP (Implementation of the Acceleration of Food Consumption Diversity activities) program. In order to encourage efforts to diversify food consumption quickly on the basis of local wisdom and integrated cooperation between the government, local government and the community. Then in 2017 the Makassar City government again created a program which is a form of PK2KP sustainability which is implemented through the utilization of alley yards through the formation of BULO which is then in the form of aisle farmer groups for chili cultivation [1].

The problem faced in implementing the BULO program is the low public response. Research activities on chili cultivation technology have been carried out in several areas, such as in South Sulawesi [2]. The study was conducted to improve local agricultural conditions with a lack of community knowledge about the technology that could be used. Therefore, it is necessary to study the Standard Operational Procedure (SOP) technology package as an effort to increase chili production. The required technology must be environmentally sound according to the biophysical and socio-economic conditions which can be described from the farming analysis [2].

Standard Operational Procedure (SOP) is a guideline for the implementation of cultivation in the agricultural sector, basically an SOP is a guideline that contains operational procedures contained in the guidelines used to ensure that all decisions and actions, as well as the use of process facilities are carried out the procedure can run effectively and efficiently, consistently, standard and systematically [3].

Based on previous research, it is not entirely that the cultivation activities carried out by a number of farmer groups are continuously controlled by the relevant agencies and there are also several farmer groups whose knowledge of plant maintenance procedures is still minimal. Plant cultivation is carried out using their own methods which are considered more practical than having to follow cultivation procedures based on Standard Operational Procedures (SOPs) which are considered complicated, difficult to understand and for various other reasons. So that it affects the growth and production of crops as well as the sustainability of urban agricultural development in Makassar City.

Based on the description above, it is necessary to conduct a research located in Manggala District, Makassar City, on the grounds as in this sub-district there are a number of active alley farmer groups that have been verified by the Makassar City Food Security Service based on previously issued programs. In addition, the location is also a center for the community activities of the city of Makassar. Therefore, a research conducted on the Evaluation of Chili Cultivation in Manggala District, Makassar City. The purpose of this study was to obtain information on the application of the Standard Operational Procedure for chili cultivation in the activities of the Lorong Business Entity (BULO).

2. Methodology

This research took place from March to May 2018. This research was conducted in Manggala District, Makassar City in eight sub-districts, namely Manggala, Bangkala, Borong, Biring Romang, Antang, Tamangapa, Bitoa, and Batua, South Sulawesi Province.

The study was conducted as a descriptive research, a method in human group research, a set of conditions, an object, a system of thought or a class of events in the present. The purpose of this descriptive study is to make a systematic, factual and accurate description or description of a situation or event, explain the relationship between phenomena, make predictions and get the meaning and implication of a problem to be solved. With this method, it is hoped that it will produce a more in-depth study and a comprehensive examination of the conditions and behavior of the object of research. A group of female farmers in were involved in Manggala District, Makassar City. The informant in this

study was the head of the female farmer group which is active and has been verified by the Food Security Service which consists of eight sub-districts.

2.1. Data collection method

The data used consisted of primary and secondary data. Primary data was collected by direct observation or by conducting field observations and conducting interviews. The purpose of primary data collection is to obtain an overview of the current environmental conditions of the study area and the changes that have occurred by viewing or existing information without having to take samples. Secondary data is obtained through literature related to respondents' descriptions and information about Chili SOP. The literature study consists of a theoretical review and data collection of related agencies. Theory review is an activity of collecting data through theories of expert opinion which are closely related to research. For collection from related agencies, it is adjusted to the data needs required in the study.

Related agencies in this research are the Makassar City Central Statistics Agency (BPS) and the Head of the Makassar City Food Security Service. The observation variables, types, collection procedures and data sources can be seen in table 1 as follows:

Table 1. Observation variables, types, collection procedures, data sources.

Observation variable	Data type	Data Collection Procedures	Data Sources
Location of BULO program - Farmer group address - Farmers group data	Secondary data	Observation and interview	Makassar City Food Security Service and Sub-District Offices
Standard Operational Procedure (SOP) of chili agronomy	Secondary data	Literature study	Makassar City Food Security Service. Agricultural Research and Development Agency
Status of farmer group activities carried out by farmer groups	Primary data	Observations, and interviews with Business Entity activity (BULO) actors in Manggala District	Makassar City Food Security Service, Extension, Head of RW / RT, Head of farmer and community groups
Evaluation of chili cultivation techniques applied by farmer groups	Primary data	Observations, and interviews with Business Entity activity (BULO) actors in Manggala District	Head or members of Farmer groups
Problems / constraints encountered while carrying out activities of the Lorong Business Entity	Primary data	Interview with Manggala District Community	Head of RW / RT, Head of farmer and community groups

2.2. Data analysis

This study uses a qualitative descriptive approach, namely the research method used to examine the conditions of natural objects, (as opposed to experiments) where the researcher is the key instrument. The data collection technique was done by triangulation (combined), inductive analysis, and the results of qualitative research emphasized more on meaning than generalization [4]. Qualitative methods

are research procedures that produce descriptive data in the form of written or spoken words from people or observed behavior. This qualitative method is still supported by qualitative data.

The data analysis technique used in this research is to use the steps as proposed by Burhan [5], which are as follows:

2.2.1. *Data collection.* Data collection is an integral part of data analysis activities. The data collection of this research is by using observation and interviews.

2.2.2. *Data reduction.* Data reduction as a research process, focusing on simplifying, abstracting and transforming emerging data and field notes and interviews from BULO activity actors.

2.2.3. *Verification and confirmation of conclusions.* This is the final activity of data analysis. Drawing conclusions in the form of interpretation activities, namely finding the meaning of the data that has been presented.

2.2.4. *Triangulation.* Triangulation is a data validity checking technique that utilizes something outside the data for checking purposes or as a comparison to this data. While the procedure is that the researcher compares the data from observations and interviews because this method is very possible so that there is a match between the data obtained from the results of observations and interviews so that the data obtained is more accurate and has a level of truth that can be accounted for.

2.3. The scoring for chili cultivation techniques

The data obtained from the field are qualitative, prior to analysis, a scoring was carried out on the cultivation technique of the chili plant. Scoring given to each chili cultivation technique is based on the results of interviews and observations which are presented in tabular form. Cultivation techniques on chili plants include several stages including seeding, planting, maintenance and harvesting.

Based on the assessment, each cultivation technique activity is categorized as 4 classes based on an ordinal scale ranging from those that really correspond to a score of 100, to those that do not match a score of 25. The following is the classification category based on Arikunto [6].

Table 2. Scoring categories for chili cultivation techniques.

Category	Scoring
Highly suitable	100
Suitable	75
Moderately suitable	50
Component do not exist	25

The higher the suitability of agricultural cultivation techniques, the higher the scoring value obtained in each category of cultivation technique class. Based on the results of an interview with one of the key informants at the Food Security Service, the success rate of chili cultivation is declared successful if the chili production reaches 200 gr / tree, so the success rate of chili cultivation in the corridor business entity program activities is categorized as shown in table 3.

Table 3. Success rate of chili cultivation.

Production (gr/tree)	Criteria
≥ 200	Successful
150 – 199	Moderately successful
100 – 149	Poor
≤ 100	Fail

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3. Results and discussion

3.1. Profile of farmer groups in the study site

The profiles of the woman farmer groups that are still active in carrying out and continue to conduct the agricultural cultivation activities in Manggala District, Makassar City as shown in table 4.

Table 4. Profile of Farmer Groups in Manggala District, Makassar City.

Sub-district	Farmer group name	Members (farmers)	Years since med	Land ownership
Manggala	Mawar	20	1 year	Backyard
Bangkala	Selasi	30	17 years	Empty space lended
Biring Romang	Idaman	25	1 year	Backyard
Borong	Anyem	25	1 year	Backyard
Antang	Mencong Taring	20	1 year	Community's open space
Bitoa	Balang Tonjong	20	1 year	Backyard
Tamangapa	Sejahtera	20	20 years	Backyard
Batua	Swadaya	25	6 years	Head of Farmers's group land

Primary data after processing, 2018.

In Manggala Sub-district, there is one farmer group that was the research sample, namely the Mawar farmer group. The Mawar Farmer Group was formed in 2017, has group members as many as 20 people aged 40 - 55 years, and is still actively cultivating several types of horticultural plants, especially in the BULO program cultivation activities. The land for the Mawar group is located in the front yard of the head of the Mawar farmer group's house, with an area of about 6 meters.

In Bangkala Sub-district, there is a sample of farmer groups who use the vacant land that is lent as a place to cultivate crops and actively participate in the Lorong Business Entity program which relies on chili as a commodity. The Selasi farmer group was formed about 17 years ago with a total membership of 30 people, with an average age of 40 - 80 years.

In Biring Romang Sub-district, there is a sample of farmer groups, namely the Idaman farmer group, which was formed in early 2017 with 10 female group members. The head of the Idaman farmer group is 50 years old, but on average the members of the other groups are 45 - 60 years old. It is a farmer group that has the least number of members in the study area, by utilizing a house yard with an area of about 4x4 m.

In Borong Sub-district, there is a sample of the Anyem farmer group that is still active in carrying out and continuing chili cultivation activities in the BULO program by utilizing a house yard of around 4x3 meters as the main land for plant cultivation activities. The Anyem farmer group was formed in early 2017 and consists of 25 women, with an average age of 45-60 years. The dominant farmer group consists of housewives who carry out and continue the cultivation of horticultural crops at the research location.

In Antang Sub-district, there is a sample of farmer groups, namely the Moncong Taring farmer group. The Moncong Taring Farmer Group, which has been formed since 2017, has 20 members, with an average age of 30-45 years, which is a group of farmers who have participated in the BULO program in developing chili plant commodities. Meanwhile, the Damai farmer group, which is a women farmer group that has been formed since 2015, has as many as 20 members, with an average age of 45 - 55 years. The farmer groups use the community's vacant land as land for plant cultivation activities. Just like other groups, the Moncong Taring group only ran the BULO program with the commodity of chili, at the time of the observation at that location.

In Bitoa Sub-district, there is a Balang Tonjong farmer group that was formed in 2017 with 20 members, with an average age of 45 - 60 years. The farmer group conducts cultivation activities in the yard of the house. The interest and activeness of the community in the area is somewhat lacking based on the results of observations and interviews with the local group leaders, only the remaining BULO program plants were found at the location when the observation was made.

In Tamangapa Sub-district, there is a Prosperous farmer group that formed a group of women farmers since 20 years ago before the government program was launched and has 20 members whose average age is 50 - 60 years. At the time of observation at the location, there were several chili plants arranged neatly in the alley and yard of the group members' houses as well as the house of the group leader.

In Sub-district of Batua, there is a sample of farmer groups, namely the Swadaya farmer group, which was formed 6 years ago with 25 female group members. The head of the Self-Help group is 46 years old, but on average the members of the other groups are 45 - 55 years old. At the time of observation at the location, there were several chili plants arranged neatly on the shelves and in the green house which were not used as a location, namely the empty land for the group leader.

3.2. Implementation of chili GAP

The growth and development of chili plants that will be produced at harvest is very influential by many factors, including cultivation techniques and the environment. The cultivation technique factor is very important in the chili plant development program as a BULO commodity in Manggala District. Chili cultivation techniques are carried out based on SOPs that have been specifically stipulated in Makassar City. There are several cultivation techniques carried out in the chili plant development area in Manggala District, including seeding (preparation of planting media, soaking seeds, ripening seeds, transferring seeds, maintaining seed conditions and seed selection), planting (preparation of planting media, planting time and methods. planting), maintenance (watering, fertilizing, pruning and watering) and harvesting (age of harvest and harvest criteria).

The percentage of chili cultivation techniques that are carried out by comparing the Standard Operational Procedure (SOP) carried out by respondents in the Manggala District area is shown in table Comparison of chili cultivation techniques in Manggala District in each Sub-district based on Standard Operational Procedure (SOP) starting from seeding, planting, maintenance to harvesting.

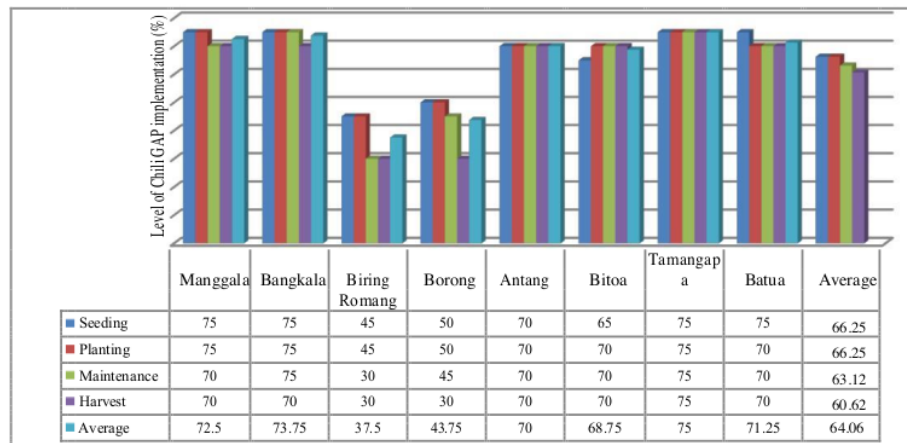


Figure 1. Comparison of chili cultivation techniques for each Sub-district.

Based on figure 1, the results of the interview comparison of chili cultivation techniques in each sub-district, starting from seeding, planting, maintenance and harvesting by comparing the Standard

Operational Procedure (SOP). Sub-district of Tamangapa has the highest scoring starting from seeding with a scoring of 75%, planting with a scoring of 75%, maintenance with a scoring of 75% and harvesting with a scoring of 75%. This shows that the cultivation technique carried out is in accordance with the SOP.

Biring Romang sub-district has the lowest score in conducting chili cultivation techniques, starting from seeding, planting, maintaining and harvesting by comparing the Standard Operational Procedure (SOP). The seeding technique has a score of 45%, planting has a score of 45%, maintenance has a score of 30% and harvest has a score of 30%. This means that the technique is not in accordance with the SOP.

Fertilization activity is one of the most important activities in the maintenance of plants in polybags which affect the production of these chili plants. This is based on Tjandra (2011) in Umah [7] which stated that fertilization causes the need for nutrients to be met, nutrients are important elements for plant growth, without the presence of nutrients, plant growth will be disrupted and even die, because That fertilization must be carried out regularly until the plants are maximally aged. And also supported by Duaja et al. [8] who stated that in modern agricultural systems, the use of inorganic fertilizers has been shown to increase crop yields.

Based on figure 1, the results of the comparative interview on chili cultivation techniques in Manggala District, starting from seeding, planting, maintenance and harvesting by comparing the Standard Operational Procedure (SOP) Seedlings and planting have the highest score with a score of 66.25 and maintenance with a score of 63.12 and harvest with a score of 60.62. This shows that the seeding and maintenance techniques are carried out in accordance with the SOP.

3. Production of chili in Manggala District

Based on the results of interviews in the field, the chili yields in Manggala District can be seen in Table 6. below:

Table 5. Chili yields produced by respondents in Manggala District.

Sub-district	Production (g/tree)	Level of success
Manggala	175	Moderately Successfull
Bangkala	150	Moderately Successfull
Biring Romang	100	Poor
Borong	125	Poor
Antang	130	Poor
Bitoa	110	Poor
Tamangapa	200	Successfull
Batua	160	Moderately Successfull
Average	143.75	Poor

Primary data after processing, 2018.

Based on table 5 above shows that Manggala Sub-district has a yield of 175 g, Bangkala Sub-district 150 g, Biring Romang Sub-district 100 g, Borong 125 g Sub-district, Antang Sub-district 130 g, Bitoa Sub-district 110 g, Tamangapa Sub-district 200 g and Batua Sub-district 160 g.

From these results it can be seen that Tamangapa Sub-district had the highest success rate of 200 g / tree while Biring Romang Sub-district had the lowest yield success of 100 g / tree. Based on the results of an interview with one of the key informants at the Food Security Service, chili production is said to be high or successful if the chili production reaches 200 g / tree. However, based on the results of the interview with the extension coordinator in Manggala District, the maximum chili production yield is when the yield reaches 300 g in one harvest.

From the interview results, it can be seen that the chili yields in Manggala District are low. This is due to their lack of interest and experience in agriculture. In addition, it is caused by the maintenance factor that has not been maximized so that it affects the production of chili plants. The research results of Saptana [9] explain that to increase production yields and avoid fail in productivity risks, some aspect needs to be taken in to account namely: (1) paying attention to the location used, (2) paying attention to how maintenance is carried out.

Respondents have different farming experiences. Farming experience affects the way respondents cultivate chili plants. Farming experience is one of the factors that affect the level of skill of the respondent in managing his farm. Longer work experience can make farmers have the ability to carry out production and development activities in the agricultural sector compared to less experienced farmers. However, it is not certain that experienced farmers will be better than those who are less experienced because there are other factors in carrying out a production activity in the agricultural sector [10].

4. Problems in chili cultivation

The results of observations and interviews conducted together with the community in each sub-district obtained information about problems or obstacles in conducting chili cultivation, namely: pests and diseases, difficulty obtaining fertile land, limited land, lack of knowledge and experience regarding SOPs, lack of facilities and infrastructure provided and lack of counselling (figure 2).

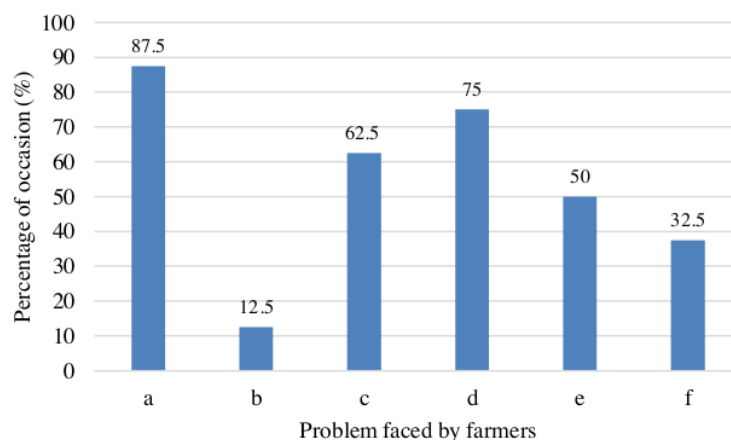


Figure 2. Problems faced by respondents in chili cultivation in Manggala District: (a) Pest and disease attacks; (b) The difficulty to obtain fertile land; (c) Limited land; (d) Lack of knowledge and experience regarding SOPs; (e) Lack of facilities and infrastructure provided; and (f) Lack of education.

Based on figure 2 above, it is revealed that the percentage of problems faced in the development of chili plants in Manggala District are pests and diseases, difficulty in obtaining fertile soil, lack of knowledge and understanding of SOP for chili plants, assistance provided by the government is still lacking, seeds, fertilizers and pesticides given the quality is not good, as well as a lack of counseling.

Of the various problems above, the biggest problem faced by respondents is the problem of pests and diseases. As is well known, the attack of pests and diseases on chili plants causes crop production to drop dramatically. Pest and disease attack is a serious problem in chili cultivation, but proper handling and control can be reduced or eliminated. The pests and diseases that mostly appear in chili cultivation in Manggala District are aphids, ants, collapsing and Fusarium wilt.

⁴Based on the results of interviews in Manggala District, the attacks of pests and diseases that often appear in chili cultivation are mealy bugs and fruit rot. The most common way of controlling is biological control by crushing garlic and papaya leaves first, then filtering them and then spraying plants that are attacked by pests and diseases.

Lack of knowledge and understanding of the SOP for chili cultivation techniques was also a problem for respondents. Some respondents cultivated chilies that were not in accordance with the SOP, so they could not get maximum yields. This is also related to the lack of counseling so that the respondents practice cultivation according to their own knowledge.

Based on the results of the interviews, most respondents did not have knowledge or experience in farming and the lack of counseling made respondents complain a lot because they could not be maximized in chili cultivation activities with limited abilities. However, on the other hand, based on the results of an interview with one of the extension workers, it was not possible to maximize it because in one extension worker handled 3 Sub-districts. The results of the interview at the food security office said that the counseling that was carried out only invited a few farmer groups, this was because seeing the object of the farmer group that was suitable meant that the farmer group was still active.

²4. Conclusion

Based on the results of the research conducted, it is concluded as follows:

- The level of application of SOP for chili cultivation techniques in Manggala District, Makassar City is 64.06% with the highest application in Tamangapa Sub-district, namely seeding techniques (75%), planting techniques (75%), maintenance techniques (75%), harvesting techniques (75%) and the lowest percentage of Biring Romang is seeding techniques (45%), planting techniques (45%), maintenance techniques (30%), harvesting techniques (30%).
- The success rate of chili cultivation in Manggala District was 143.75 g / tree which was categorized as less successful. The highest chili production was in Desa Tamangapa as much as 200 g / tree with the successful category, while the lowest chili production was in Sub-district Biring Romang as much as 100 g / tree with the category less successful.
- The most common problems faced by pest attack respondents are mealy bugs and diseases, namely fusarium wilt with an incidence percentage of 87.5%

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