Implementation study of Good Agricultural Practices (GAP) of Red Fruit (*Pandanus conoideus* Lamk.)

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Abstract. This study aims to determine and analyze the GAP components that have been implemented by red fruit farmers. The method used in the study was a survey method of plant cultivation. The multistage random sampling method used to taking sampling sampling. The area selected for the study area uses the land ownership startification. Each village was randomly sampled as many as 10 farmers, the total number of which was 30 sampled farmers. The results showed that the farmers in the Taniwel District had not fully implemented the GAP guidelines in the cultivation of red fruit plants which included seeding methods, maintenance and post-harvest processing. This is due to the absence of outreach or counseling from the relevant Dinas regarding the GAP guidelines for red fruit plants.

1. Introduction

Red fruit is an endemic plant that grows wild in Maluku and Papua [2] [6]. Red fruit is the fruit of a type of pandanus plant. Red fruit has become one of the medicinal plants that attracted attention and has been widely studied since the end of 2004 [3] [7]. In Maluku and Papua, red fruit plants found in coastal areas to the highlands. Red fruit plants are found growing in areas with an altitude between 0-2300 meters above sea level (asl). Red fruit can also found growing in the northern part of Maluku that spreads from coastal areas to mountainous areas [4] [7]. The results of Makaruku's research (2016) show that the distribution area of red fruit plants in Taniwel District, West Seram Regency grows at an altitude of 1 - 700 m asl and has the largest population of red fruit plants at an altitude of 300 - 400 m asl. Fruit plants grow from areas with topography / slopes ranging from gentle / wavy areas 3 - 8%, wavy areas 8 - 15%, slightly steep areas 15 - 30% to steep areas 30-45%. The soil in Taniwel District is acidic to slightly acidic with a pH ranging from 5 to 6. The soil in Taniwel District has a gelatinous sand texture with cambisol, rendzina and podzolic soil types. This soil condition is supportive of the growth and development of red fruit plants. The distribution of red fruit plants only found in certain areas in West Seram Regency [7]. GAP is a guide on how to cultivate fruit and vegetable crops appropriately, well, correctly, environmentally and produces products that are safe for consumption. The application of GAP reflects the three pillars of sustainability, namely economically feasible, environmentally friendly and acceptable to the community [8]. Mahyuda et al (2018), stated that the application of GAP for Gayo arabica coffee cultivation has an effect on increasing coffee production and quality [5] [8].

In West Seram District, red fruit plants can grow and produce well, but the cultivation system is still traditional [7]. The facts in the field show that of the entire GAP component, it is possible that
only farmers have adopted a few parts, but the majority of farmers have not implemented GAP optimally because it requires high costs, has a complicated procedure and a high level of order. In addition, the socio-economic condition is still low and the lack of socialization about GAP from the government causes farmers to have no further interest and understanding about GAP [8]. This study aims to determine and analyze the GAP components that have implemented by red fruit farmers.

2. Methods
The method used in the study was a survey method of plant cultivation. The research was conducted in Riring Village, Rumah Soal Village, Lohia Sapalewa Village, Taniwel District. The selected area is determined by considering that the area is a red fruit production center, has a large population of red fruit plants and has a different pattern and type of planting. The material used was a sample of the red fruit plant population. While the tools used are clinometers, voice recorders, questionnaires, stationery and cameras.

The multistage random sampling method used to sampling system. The area selected for the study area uses the land ownership startification. Ten farmers randomly sampled in each village so that the total number of farmers was 30 sampled farmers. Information will be collected from sample locations, namely primary data by means of direct observation on how to cultivate red fruit plants and interviews, while secondary data comes from related agencies. The research data were analyzed using qualitative and quantitative methods. Quantitative data input tabulation system. The qualitative analysis just has analyzed descriptively. Descriptive analysis used to determine the general description of the object of research, the characteristics of farmers including age, gender, education level, farming experience and farming characteristics.

3. Results and discussion
3.1. General conditions of Respondens
The population of West Seram Regency based on the Population and Civil Registration Service in 2017 was 208,009 people, consisting of 106,410 male residents and 100,599 female residents. Compared to the total population in 2016, the population of West Seram experienced a growth of 0.85%. Meanwhile, the 2017 male to female population ratio was 105. The population density in West Seram Regency in 2017 was 30 people / km². Population density in 11 sub-districts is quite diverse with the highest population density located in Kairatu Barat Subdistrict with a density of 106 people / km² and the lowest in Elpaputih District at 4 people / km². From 2015 to 2017, the sex ratio of the population of West Seram was always above 100. This means that the number of male population is more than the number of female population [1].

| Description | Village (%) |
|-------------|-------------|
|             | Rumah Soal  | Riring  | Lohia Sapalewa |
| Farmers age |             |         |               |
| a. 20-30 years old | 0 | 0 | 20 |
| b. 31-40 years old | 30 | 20 | 30 |
| c. 41-50 years old | 60 | 50 | 40 |
| d. 51-60 years old | 0 | 10 | 0 |
| e. 61-70 years old | 10 | 10 | 10 |
| f. > 70 years old | 0 | 10 | 0 |
| Last education |             |         |               |
| a. Been to school | 10 | 20 | 10 |
| b. Elementary school | 20 | 0 | 20 |
| c. Junior high school | 30 | 30 | 30 |
| d. High School | 40 | 50 | 40 |
The age of the farmers in the three villages in Taniwel District evenly distributed from the age of 20 to over 70 years. The largest number of farmers is aged 41-50 years, spread across three villages, namely the Rumah Questions Village at 60%, Riring 50%, Lohia Sapalewa 40%.

Farmers' education is closely related to the farmer's age, this is because on average younger farmers go to high school level while farmers who are over 70 years old have only been educated for only 3-4 years.

3.2. Implementation of the Red Fruit GAP Component in Taniwel District

The results of the percentage of farmers who answered the questionnaire are presented in Figure 1 and Table 2. Red fruit plants cultivated in Taniwel District are still in different planting locations, namely in hills, riverbanks and roadsides resulting in unreached plants often not being managed properly. In Figure 1 and Table 2, it shows that generally farmers who cultivate 100% red fruit have not followed the cultivation recommendation from the Dinas (question no. I). This is because extension officers do not conduct counseling and socialization activities regarding good red fruit cultivation techniques to farmers so that generally the cultivation techniques used by farmers are only based on hereditary experiences that have been carried out by their parents.

In Taniwel District, the ownership of plants was 26.7%, and more were farmers who continued to cultivate crops belonging to their parents or inherited by 73.3% (questions no. II-a and II-b). This is because for them the marketing process for red fruit is still difficult, so the harvested red fruit generally used for their own purposes. For Kairatu Subdistrict, the ownership of plants itself is more, namely 80% and only 20% is still cultivating plants owned by parents (questions no. II-a and II-b).

The cropping pattern used by farmers in Maluku in cultivating red fruit plants in Taniwel District is still a mixed cropping pattern (question no. III) This is because most Maluku people use the dusung system so that seasonal and annual crops, both plantation crops and crops Fruits or other plants of economic value planted in one area to form a dusung.

Most of the Taniwel sub-districts carry out their own nurseries 100% (question no. IV) But the seeds used are quite diverse. Farmers do not use seeds from seeds because of their relatively low growth capacity and based on their experience who have tried to use seeds as seeds, it turns out that most of the seeds sown do not grow. In Taniwel District 16.6% used seedlings from cuttings and 83.3% used seedlings from tillers (questions no. V-a and V-b) and this greatly affected the population and production of red fruit plants. Generally, farmers in Maluku cultivate five types of red fruit plants, namely saune Ellah, saune Ole, saune Porol, saune Oti and saune Batu. In Taniwel District, the farmers who cultivate Ellah saune are 60% and Oti saune as much as 40% (questions no. VI-a, VI-b, VI-c, VI-d and VI-e). Farmers in Taniwel District do not use spacing 100% at the time of planting (questions no. VII-a and VII-b). Based on the picture above, it can be seen that in Taniwel District, farmers do not fertilize with manure (question no. VIII-a). Farmers do not carry out the red fruit plant maintenance by regular watering. Watering done only at the beginning of planting until the plants can survive in the land and then the plants only depend on groundwater sources, rainwater and humidity that can help the growth of red fruit plants. Only 16.7% of the farmers in Taniwel District do watering (question no. VIII-b). In the Taniwel District, the farmers who did weed were 83.3% (question no. VIII-c). Farmers do weeding only by cleaning the weeds around the plants and cutting off some of the leaves that will be used as plaiting materials at the same time. Red fruit plants shading done at the beginning of planting until the plants are able to adapt to the land.
Figure 1. Percentage of farmers who carry out the cultivation of red fruit plants for Taniwel District

Table 2. Picture 1 description List:

| No. | Description                                      |
|-----|--------------------------------------------------|
| I   | Not following the cultivation method from the Dinas |
| IIa | Owned plants inherited from parents              |
| IIb | Not a self-owned plant                           |
| III | Mixed cropping patterns                          |
| IV  | Do your own nursery                              |
| V-a | Seedlings of cuttings                            |
| V-b | Seedlings                                        |
| VI-a| Types planted (Saune Ellah)                      |
| VI-b| Types planted (Saune Oti)                        |
| VII | Using spacing                                    |
| VIII-a| Fertilize with manure                            |
| VIII-b| Doing watering                                  |
| VIII-c| Doing weed weeding                              |
| VIII-d| Use shade                                       |
| VIII-e| Eradication of pests and diseases with pesticides |
| IX-a| Harvest 1 time a year                            |
| IX-b| Harvest 2 times a year                           |
| X-a | Sold in the form of fresh fruit                  |
| X-b | Sold in the form of oil                          |
| XI  | Simple oil processing                            |
| XII-a| The fruit is processed as a medicinal ingredient  |
| XII-b| Fruit is processed as cooking oil                |
| XII-c| The fruit is processed as essential oil          |
| XII-d| Fruit is processed as a sauce                    |
| XII-e| Fruit is processed as lunkhead                   |
| XII-f| The fruit is processed as a natural dye          |
| XIII-a| The use of leaves as plait                       |
| XIII-b| Use of trunks as buildings and fences            |
In Taniwel District, 33.3% of the farmers used shade (question no. VIII-d). Eradication of pests and diseases is very rarely carried out because red fruit plants are rarely attacked by pests and diseases, most of the plants are collapsed as result of being hit by strong winds. Farmers in Kairatu and Taniwel Districts do not use 100% of pesticides, either chemical pesticides or biological pesticides (question no. VIII-e). Meanwhile, for the control of pests and diseases in fruits attacked by caterpillars and birds, farmers only use mechanical pest eradication with bird traps, look for, and kill caterpillars that attack red fruit. Farmers in Taniwel Subdistrict have planting locations that are very far away and can only reached by foot, which is about 66.7% of farmers who have red fruit planting locations located in the hills, causing farmers not to take intensive action to take care of their plants. Farmers in Taniwel District 100% (question no. IX-a) harvest red fruit only once a year, namely in October, so that it becomes an obstacle in increasing the yield of red fruit plants.

The motive for selling red fruit crops for sale seen that 100% of farmers did it in the form of fresh fruit (questions no. X-a and no. X-b). The 100% processing of red fruit oil by farmers in Taniwel District (question no. XI) still done simply or traditionally using bamboo. The use of red fruit oil produced by farmers in Taniwel District still uses red fruit oil for their daily needs in place of coconut oil. Very limited knowledge about good red fruit oil processing techniques and inadequate technology is a huge obstacle in the use of red fruit. This can seen in Figure 1, namely the utilization of red fruit in Taniwel District 100% of farmers do not use and process red fruit as essential oil and as a food ingredient such as dodol (questions no. XII-c and XII-e). Farmers in Taniwel District (question no. XII-f) use red fruit as a 100% natural dye because this knowledge has obtained from their parents from generation to generation and can be done using traditional and simple tools. Farmers in Taniwel District 100% use red fruit as cooking oil instead of coconut cooking oil, 33.3% use red fruit as a sauce and 33.3% use red fruit as a medicinal ingredient (questions no. XII-a, XII-b and XII-d). In addition, 100% of farmers in Taniwel District use the leaves of the red fruit plants as plait for sale and daily needs (question no. XIII-a). The use of red fruit stems as building material and fence material by farmers in Taniwel District is around 80% (question no. XIII-b) (question no. XIII-b).

4. Conclusion
Farmers in Taniwel Subdistrict have not fully implemented GAP guidelines in the cultivation of red fruit plants which include seeding methods, maintenance and post-harvest processing. This is due to the absence of outreach or counseling from the relevant Dinas regarding the GAP guidelines for red fruit plants.

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