

Cassava Variety Adoption in North Sumatera
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Introduction

North Sumatera is one of the cassava production centre in Indonesia. Based on the data of Indonesian Statistic Agency (BPS), the average yield of cassava in the North Sumatra is around 30 t ha⁻¹. Although this yield is considerably high enough, it is still lower compared to the potential yield which can reach to 50 t ha⁻¹.

The Rapid Rural Appraisal (RRA) and house-hold that were conducted in 2016 and 2017 showed that farmers used only local cassava variety. Variety test carried out in 2016, showed that some introduced varieties yielded a higher tuber yield compared to the local variety. The Malang 4 variety has the highest average yield among the 12 varieties tested which is 49.83 t ha⁻¹. The Malang 4 variety was also the most preferred by farmers in terms of the characteristics of branching, ease of harvest, tuber size, tuber type, plant height and starch content. Therefore, Malang 4 variety were chosen to be distributed to farmers through variety adoption activities.

The aim of this report was to investigate the possibility of increasing cassava yield in farmland, and also investigated the limitation of planting Malang 4 in farm level.

Methods and Design

Cassava was planted on farmer's field, by farmers. The cultivation of cassava (land preparation, plant spacing, fertilizer, weeding) was done according to the farmers practice. After harvesting, farmers hand over 50% of their cassava stem to the project to be distributed to other farmers. As for compensation, the project paid Rp.500.- per stem (can be used up to 5 cutting). The project helped with cutting material, fertilizer and herbicide, and supervised to ensure that the work was done correctly.

In 2016-2017, there were 26 farmers planted Malang 4 which distribute in 4 sub-districts of Simalungun District and 1 sub-district of Toba Samosir District. Each farmer planted Malang 4 on area of about 0.2 to 0.3 ha. In 2017-2018, the number of farmers participate in the project increase to 51 farmers. The area includes Simalungun Regency (3 sub-districts), Toba Samosir Regency (1 sub-district), and Deli Serdang District (2 sub-districts). There are more farmers willing to participate, but there was not enough cassava cutting.

To measure the yield, the project team took 16 farmers field randomly as the samples. In addition to yield, observation was done for the problems and farmers' opinion of planting Malang 4. The yield data of previous year was also collected from the farmer. If the farmer could remember, he asked to make a comparison; higher, about the same or lower.

Result

The total land area for adoption of Malang 4 variety in 2016-2017 was around 4.68 hectares. The total land area for adoption of Malang 4 variety in 2017-2018 was around 8.22 hectares. The yield target 60 farmers could not be achieve because stem cutting from some adopter farmer in 2017 could not harvest due to suffer from drought.

Table 1. Tuber yield of Malang 4 variety in several adopter farmers. 2017-2018 planting season.

No	Name	Address	Variety	Yield (t ha ⁻¹)	Previous year
1	Pak Mukhlis	Kec. TapianDolok	Malang 4	30.40	Malaysia, the same
2	Pak RasmenPurba	Kec. TapianDolok	Malang 4	33.06	Malaysia, lower
3	DewiPangaribuan	Kec. TapianDolok	Malang 4	29.57	Malaysia, the same
4	LumonggaSiallagan	Kec. SiantarMartoba	Malang 4	33.45	Malaysia, lower
5	Edison Pasaribu	Kec. TapianDolok	Malang 4	30.00	Malaysia, the same
7	Bu Sirait	Kec. DolokPanribuan	Malang 4	34.75	ubi roti lampung
8	Pak Naryo	Kec. DolokMerlawan	Malang 4	44.02	ubi roti (30 t ha ⁻¹)
9	Pak Parmin	Kec. DolokMerlawan	Malang 4	38.10	ubi roti (30 t ha ⁻¹)
		Intercrop with maize	Maize	3.50	-
10	MarolopSitorus	Kec. Uluan, TobaSa	Malang 4	51.00	Adira 4 (40 t ha ⁻¹ , 12 mo)
11	MarataSirait	Kec. Uluan, Tobasa	Malang 4	42.50	Adira 4 (37.5 t ha ⁻¹ , 12 mo)
12	AfnitaSianturi	Kec. Uluan, Tobasa	Malang 4	44.50	Adira 4 (25 t ha ⁻¹ , 12 mo)
13	RihardSitorus	Kec. Uluan, Tobasa	Malang 4	48.00	Adira 4 (25 t ha ⁻¹ , 12 mo)
14	Jenti M. Manik	Kec. Uluan, Tobasa	Malang 4	50.50	Adira 4 (30 t ha ⁻¹ , 12 mo)
16	Anita Manurung	Kec. Uluan, Tobasa	Malang 4	48.00	Adira 4 (25 t ha ⁻¹ , 12 mo)

Discussion and Conclusion

The yields of Malang 4 variety in Simalungun and Toba Samosir districts, North Sumatra Province, vary greatly due to differences in cultivation techniques of each farmer (planting method, spacing, fertilizer) and weather conditions. The method of planting and spacing used by farmers varied, namely monoculture with a spacing of 0.8 m x 0.8 m, 1 m x 0.6 m, 1 m x 0.7 m, 1 m x 1 m, 1.2 m x 1 m and intercropping with a spacing of 1.5 m x 0.8 m.

The tuber yield that harvested under normal conditions was range from 29.57 t ha⁻¹ to 51 t ha⁻¹. Based on the information from the adopter farmer, in general, the tuber yield of Malang 4 variety was higher compared to the results of the tubers of cassava varieties planted in the previous season. For an example, in the Toba Samosir District, Rihard Sitorus obtained Malang 4 tuber yield by 48 t ha⁻¹ at 12 months of harvest, while previous yields used Adira 4 variety as much as 25 t ha⁻¹, hence the difference in tuber yields of both varieties was 23 t ha⁻¹.

However, because the North Sumatra province has a wet climate, cultivation of Malang 4 variety has constraints on the occurrence of tuber rot, especially in Simalungun Regency. Based on information from one adopter farmer, the percentage of tuber rot was estimated at 15%. To overcome these obstacles, it was expected that farmers can implement a ridge system or make a better drainage system on their land. So far, farmers in North Sumatra have never applied cassava using a mound.

Some farmers were experience crop failure due to drought, especially farmers who plant in January 2018. Some farmers cannot harvest at all, while other farmers can harvest but the results are not optimal. For adoption activities in 2019-2020, planting activities will begin around July-August 2019.



Figure 1. Performance of Malang 4 variety in adoption activities. 2018-2019 planting season.