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STAKEHOLDER BRIEF

ACIAR Cassava Value Chain and Livelihood Program

Pests and Disease in the Cassava Sector in Indonesia

Summary

In tropical areas, especially in areas with unpredictable rainfall climate, cassava (*Manihot esculenta* Crantz.) is a crop which is still able to grow reasonably well. Cassava is a popular crop among farmers in tropical areas, mainly because of the low inputs needed to give a reasonable yield. However, if cassava is to be used effectively as a cash crop, it still needs external inputs such as fertilizer, and a crop management plan. Indonesia is one the largest producers of fresh cassava roots in the world. However, the variability of micro-climates across Indonesia mean that there are many different pests and diseases that affect cassava production across the country. In dry climatic conditions, cassava mealy bug attack is commonly found in Indonesia, with the potential to reduce yield by up to 40%. In wet climate conditions, mealy bugs do not cause problems, but cassava root rot is more prominent.

Field trials carried out in Simalungun district of North Sumatra Province and Sikka regency of East Nusa Tenggara Province under the project AGB/2012/078 between 2015 and 2020 show that the cassava pest and diseases differ between the regions. In the dry climatic conditions in Sikka, mealy bug is the most common problem, whereas in the wet climatic conditions of Simalungun, cassava root rot was discovered in the 2017-2018 planting season. In Sikka mealy bug attacks occurred 7-8 months after planting, but there was a relatively low impact in terms of decreasing yield in the farmers field. In Simalungun, cassava root rot occurred in farmers' fields as well as in the trial field, especially in areas with relatively flat land. Field assessment in the 2018 planting season found that in average around 5-10% of cassava in the farmers field in Simalungun were affected by root rot.

Key policy recommendations are crop management to tackle the problem of cassava pest and diseases. In Sikka, to prevent the breakout of cassava mealy bug attack, farmers should practice integrated pest management, as well as introducing a natural predator of cassava mealy bug. In Simalungun, one of alternatives to tackle the problem of root rot is by planting with a ridge system in the field.

Background

Sikka Regency, one of the important cassava production areas in East Nusa Tenggara (NTT), has a dry tropical climate, with relatively high air temperatures. The minimum temperature ranges from 20.6 °C to 24 °C with an average of 23.7 °C. The lowest minimum temperature occurs in September and the highest in January. The average maximum temperature is between 31.7 °C – 24.5 °C with an average of 27.6 °C. The lowest maximum temperature occurs in December – January and the highest in August – September. Air humidity varies between 69% – 86% with an average of 77%. The highest air humidity occurs in February and the lowest in August. In contrast to NTT, rain occurs almost all year round in North Sumatra. The least rain occurs in September (1 mm) and the highest is in February (30 mm). The average annual temperature is around 25.6 °C. Thus, Sumatra is classified as an area with climate type A (very wet) with the peak rainy seasons occurring in October and January.

The difference of climatic condition between the two locations affects the strategies used for pest and disease management for cassava farming. In the dry climatic conditions of East Nusa Tenggara, mealy bug attacks often occur in the dry season of August – November. Farmers are reported to understand the effect of mealy bug in decreasing yield of their cassava. In wet climatic condition of Simalungun, mealy bugs are not a problem, but in the last few years, farmers have noticed the appearance of root rot in their farms.

Key Issues



Mealy bug attack in East Nusa Tenggara: During a Focus Group Discussion and household survey in 2016 and 2017, it was observed that there was an abundance of mealybugs in farmer's fields. Observation in 2018 showed that a lot of cassava fields were infested by mealybug, with the intensity reaching up to 100% of the field area. However, there was very little difference between the yield of healthy and infested cassava. The reason was probably that the infestation occurred after the cassava tuber had already developed. In order to confirm this hypothesis, a further study was conducted to measure the degree of mealy bug attack.

Root rot attack in Simalungun: Based on the harvests of varietal testing trials in 2016 and further harvesting of six varieties in 2017/18, root rot appears to play a role in decreasing cassava

productivity. This was also the case during fertiliser trials undertaken in 2017 using Malang4 and Malaysia varieties. Although Malang 4 was the best performing of the varieties, when it is harvested late (12 -14 months after planting) it is susceptible to severe root rot. Therefore, to sustainably improve cassava

productivity in Simalungun, root rot needs to be addressed. Root rot can be reduced by improving soil fertility with organic matter and by improving soil drainage to reduce water logging.

Key relevant findings from research

Agronomic analysis undertaken in Sikka in 2018 – 2019 has shown that to a certain degree the mealy bug attack would not significantly reduce the yield of fresh cassava root. On the other hand, root rot that was observed in Simalungun has a significant impact and must be cautiously managed with a proper soil drainage management and organic matter application to further reduce the risk of decreasing yield.

Agronomic Results

In **Simalungun**, an agronomic trial with soil drainage management to avoid water logging was conducted in 2018 – 2019 planting season. There were 3 soil tillage treatments tested to prevent waterlogging that can cause root rot, namely flat bed, ridges and drainage with ridges. The trial also studied the effectiveness of applying organic matter to the soil to improve soil drainage. The results showed that organic matter application (in the form of manure at 10 tons per hectare) improved yield up to 20% compared to the control in all soil tillage management. Improved soil tillage management (ridges and drainage with ridges) also improved cassava yield by between 15 – 30 % compared to the flat bed soil management. Root rot was not observed in the ridges and ridges with drainage, while in the flat bed around 10% of plants suffered from root rot.



Recommendations based on research findings

Timing of planting in East Nusa Tenggara and integrated pest management:

The main recommendation to tackle mealy bug attack in East Nusa Tenggara is to manage the timing of planting. The recommended planting season for cassava in Sikka is in early December, or early January. This will help the cassava to grow throughout rainy season (December – March), and when the dry season comes the cassava will be 7-8 months old, and hence the mealy bug attack is expected to have less impact on yield. A further recommendation is to enhance farmers capacity to undertake integrated pest management including the release of natural predators for mealy bug.

Soil tillage management for better drainage: The wet climatic conditions in North Sumatra - especially in Simalungun - allow farmers to plant their cassava all year round. However, in the last few planting seasons, root rot has been observed in some farmers fields. The root rot is mostly found in flat land with poor soil drainage. To improve the drainage and reduce the risk of root rot, soil tillage management using ridge and ridge with drainage channel as well as organic matter amendment has been proved to be effective and should be promoted to farmers through extension services and factory agents and traders.



This stakeholder brief summarises issues, findings and key policy recommendations related to pests and disease in the cassava sector in Indonesia from ACIAR Project AGB/2012/078 *Developing value-chain linkages to enhance the adoption of profitable and sustainable cassava production systems in Vietnam and Indonesia*. The project is funded by ACIAR and implemented by ILETRI, University of Brawijaya, CIAT and the University of Queensland. The intended audience of this brief is the Ministry of Agriculture, Ministry of Rural Development, Local Government and extension centres in Simalungun and Sikka and the private sector stakeholders in the cassava value chains in the two provinces.

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