

Diversification & Expansion of MARDI Premium Plant Varieties at the State of Selangor: A Case Study

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ABSTRACT

This research was written to ascertain the situation of Malaysian Agriculture Research And Development Institute (MARDI) plant variety diversity in Selangor. Several plant varieties, including MDUR 88 Durian, Melomas lime, Mutiara Wangi/Merah Rambutan, and MKL coffee, have been chosen for the project. This reward was announced on social media (via MARDI Selangor's Facebook page). The announcement contains a Google form. Following the approval meeting, 13 people were chosen to work on the projects. On January 26, 2023, a seminar on fruit and industrial crop management was successfully held in conjunction between the MARDI State TE Centre of Selangor and the Selangor State Economic Planning Unit (UPEN). 85% of participants were male, indicating that agriculture is more popular among males. Durians were chosen as the most suitable plant kind, and a total of 9 acres of durian trees would be planted, with the majority of the land located north of Selangor in the district of Hulu Selangor. MARDI hopes that this initiative will be repeated annually to guarantee that excellent MARDI plant materials are available to the people of Selangor.

Keywords: Premium Plant Varieties; Incentive; Training; Durian; Rambutan; Lime; Coffee; Selangor.

1. Introduction

The Malaysian Agricultural Research and Development Institute (MARDI) has been allocated funding in the 12th Malaysia Plan (RMK12) budget to carry out this Pioneer Project by supplying MARDI's research seeds and planting technology to eligible participants via the Technology Transfer and Entrepreneur Development Centre (TE). Agripreneurship is the need of the hour to make agriculture a more appealing and successful endeavour, and it is apparent that there is a significant potential for entrepreneurship in agriculture, which can only be realised via adequate support for this sector (Shuchi, 2019). Low-cost and free seedlings improve the likelihood of tree planting on private property, especially among new, college-educated, small-parcel owners who utilise land for pleasure (Ruseva et al., 2015).

MARDI Selangor TE has been tasked with carrying out the MARDI Plant Variety Assistance Project 2022-2023 for the state of Selangor. This project is a continuation of the Ministry of Agriculture and Food Security's initiative to broaden the range of high-quality MARDI plant varieties available in the commercial market and provide opportunities for interested farmers to cultivate MARDI plant varieties under the Empowerment of Progressive and Competitive Agro-Food Technopreneurs through the Food Technology Transfer approach. In most agriculturally-oriented activities in the research region, women participated at a lower rate than men in terms of sustainable land use, water management, and agricultural output (Yohanna et al., 2021).

Despite the evident enormous advantages accruable from ICT use internationally (Osabuohien et al., 2023), gender extension workers' use of ICTs was low in the study area. The major goal is to cultivate MARDI's novel plant materials in Selangor throughout the RMK-12 era. To help qualified participants accomplish the goal of this pioneering initiative, the TE Centre offered plant supplies and technical advice services. There are various

procedures and papers that applicants must complete in order to obtain this aid. This research was written to determine the status of MARDI plant variety diversity in the state of Selangor.

2. Implementation Method of Variety Expansion

2.1. Application process of the project

Several plant varieties have been chosen for the project, including MDUR 88 Durian, Melomas lime, Mutiara Wangi/Merah Rambutan, and MKL coffee. Calculations for each type of plant have been done based on the current pricing of each type of seedling (Table 1) to determine the area and quantity of seedlings to be delivered to project participants.

Table 1. The plant density/ha requirement for selected variety

| Bill | Planting materials variety | Plant density/acre |
|------|-------------------------------------|--------------------|
| 1. | <i>MDUR-88 Durian</i> | 40 plants |
| 2. | <i>Melomas Lime</i> | 40 plants |
| 3. | <i>MKL Coffee</i> | 512 plants |
| 4. | <i>Mutiara Merah/Wangi Rambutan</i> | 72 plants |



Figure 1. General work process of implementing projects

The news of this incentive was made via social media (MARDI Selangor's facebook page). In the announcement, there is a Google form used. A total of 80 applications have been received as of December 31, 2022. Before the officer conducts field inspections, an initial screening via phone calls has been undertaken to verify the presence of

agricultural land for each application ready for project implementation. Following the first screening, the implementing officer will lead a physical visit to the farm to check the land's status, ownership, and appropriateness for planting. Following the screening of the applications, a physical visit report with supporting documentation will be appended as proof to be provided to the meeting chairman as the project leader. The approval procedure for project execution for committee meetings is depicted in figure 1. Following the approval meeting, 13 candidates were chosen for the project (Figure 2). Farmers and other agricultural development experts who have popularised the methods under consideration are in great demand (Geleta & Kifle, 2022).

Melomas lime



MKL Coffee



Mutiara Merah/Wangi Rambutan

MDUR-88 Durian



Figure 2. Submission of Planting Materials

2.2. Training and Courses for Selected Participants

On January 26, 2023, a seminar on fruit and industrial crop management was successfully held in conjunction between the MARDI State TE Centre of Selangor and the Selangor State Economic Planning Unit (UPEN). It was physically carried out effectively because the country had exited the pandemic phase and entered the endemic age following the Movement Control Order (MCO) imposed as a result of the COVID-19 epidemic that afflicted the whole world. The session was attended by project participants (Figure 3).



Figure 3. Training and Courses for participants

Education is not perceived as a hindrance by landholders, although it cannot be ruled out as an impediment owing to the rising complexities of farming and landholders' demonstrated knowledge (Bennett & Cattle, 2014). The training programme had a favourable influence on enhancing knowledge, perceived utility, and work performance, which will greatly help long-term growth (Chandra et al., 2022). The seminar met its implementation objectives since each participant showed dedication and passion in following the supplied lessons.

This seminar includes four paper sessions provided by Horticulture Research Centre and Industrial Crop Research Centre Research Officers, as follows:

Title 1: Introduction to Durian Plant Technology.

Title 2: Introduction to Rambutan Plant Technology.

Title 3: Introduction to Bali Lemon Plant Management.

Title 4: Introduction to Coffee Plant Management.

3. Success Status of the Project

3.1. Type of plant, cultivation acreage and plants quantity of the projects

The conference authorized applications involving numerous plant kinds that had passed the screening and evaluation procedures in the field. The project participants planted a total of 9 acres of durian trees, 8.5 acres of

lime trees, 3.1 acres of coffee plants, and 2.5 acres of Rambutan trees (Table 2). Incentives, notably the provision of tree seedlings and financial rewards, have a major effect on tree planting among farmers (Tumuhe et al., 2020). The seed subsidy is unsuccessful at encouraging farmers to use high-quality seeds since farmers' seed choices are impacted by factors such as land area, revenue from vegetables and fruits, and awareness of the subsidy (Sun et al., 2013).

Table 2. Fraction by type of plant, cultivation acreage, plants quantity and participants

| Planting materials variety | Cultivation area (acre) | Cultivation area percentage (%) | Plants quantity |
|-------------------------------------|----------------------------|------------------------------------|--------------------|
| <i>MDUR-88</i> Durian | 9 | 39 | 360 |
| <i>Melomas</i> Lime | 8.5 | 37 | 340 |
| <i>MKL</i> Coffee | 3.1 | 13 | 1587 |
| <i>Mutiara Merah/Wangi</i> Rambutan | 2.5 | 11 | 180 |
| Total | 23.1 | 100 | 2467 |

3.2. Gender fraction of participants

Data analysis from 13 participants revealed that 85% were male and 15% were female (Table 3). Although MARDI's pioneering initiative does not include a gender quota, it clearly reveals that males prefer the sector of agriculture. Women farmers' poorer yields are attributed to lower levels of inputs and human capital than males, although education and access to land improve their probability of adopting new technology (Quisumbing, A., 1995). However, women were more active in processing, marketing, and record-keeping activities, whereas men were more involved in land clearing, bush burning, ploughing, operating machines, harvesting, and threshing (Yohanna et al., 2021). Sustainable agricultural intensification should use gender-transformative techniques to achieve equitable results by promoting consensus-based institutional reforms and fostering beneficial synergies across many scales (Fischer et al., 2020).

Table 3. Gender Fraction of approved application

| Gender | Numbers of Participant | Percentage (%) |
|---------------|------------------------|----------------|
| <i>Male</i> | 11 | 85 |
| <i>female</i> | 2 | 15 |
| Total | 13 | 100 |

3.3. Participant percentage based of plants varieties

Table 4 displays data analysis from 13 participants. It was discovered that 46% of applications for durian were granted, followed by 31% for lime, 15% for coffee, and 8% for rambutan, which had only one application approved. Coffee and rambutan are low in accepted applications due to a lack of interest in the plant types and the

difficulties of producing seedlings in sufficient quantities by MARDI experts (Figure 2). Community-based seed and seedling systems have increased access to high-quality planting material, improving agricultural yields by 20–50% and ensuring long-term viability (Takoutsing et al., 2014). Small farmer agricultural development administrators should focus on performance improvement and fixing identified performance gaps (Collins & Mullen, 1992).

Table 4. Fraction by type of plant and participants

| Planting materials variety | Number of participants | Percentage (%) |
|-------------------------------------|------------------------|----------------|
| <i>MDUR-88</i> Durian | 6 | 46 |
| <i>Melomas</i> Lime | 4 | 31 |
| <i>MKL</i> Coffee | 2 | 15 |
| <i>Mutiara Merah/Wangi</i> Rambutan | 1 | 8 |
| Total | 13 | 100 |

3.4. District area distribution of plant varieties

Table 5 depicts the plants distributed throughout the project members' seven district regions. According to the data, 10 acres, or 43.5% of the total, were planted with *MDUR-88* Durian in the north of Selangor, with Hulu Selangor contributing the most, with 3.5 acres, or 14.5%, planted with *MDUR-88* Durian. *MDUR-88* Durian led with 13%, or 3 acres, in the district of Hulu Langat, whereas MARDI plant types were planted on 38%, or 8.6 acres, of the total in the southern part of Selangor. Only 18.5% of the whole area, or 4.5 acres, is in Selangor's core zone. *Melomas* Lime planted 2 acres in the Shah Alam district, accounting for 9% of the total. The durian was clearly the most frequently cultivated plant species developed by MARDI, with customers exhibiting the most interest in utilising them as planting materials.

Table 5. District area distribution of plant varieties

| Varieties/Zone | North | | | Central | | | South | | |
|-------------------------------------|---------------|-------------|-------------|----------------|------------|-------------|-------------|------------|-------------|
| | District | Acreage | Percentages | District | Acreage | Percentages | District | Acreage | Percentages |
| <i>MDUR-88</i> Durian | Hulu Selangor | 3.5 | 14.5 | Kuala Langat | 1.5 | 5.5 | Hulu langat | 3 | 13 |
| | | | | Kuala Selangor | 1 | 4 | | | |
| | | | | Shah alam | 2 | 9 | | | |
| <i>Melomas</i> Lime | Hulu Selangor | 2 | 9 | | | | Hulu Langat | 2.5 | 11 |
| <i>MKL</i> Coffee | Hulu Selangor | 2 | 9 | - | - | - | Hulu Langat | 1.1 | 5 |
| <i>Mutiara Merah/Wangi</i> Rambutan | Sabak Bernam | 2.5 | 11 | - | - | - | Selangor | 2 | 9 |
| Total | | 10.0 | 43.5 | | 4.5 | 18.5 | | 8.6 | 38 |

To meet the demands of emerging technologies and guarantee the viability of the seed exchange and multiplication system, seed producers and marketing cooperatives should be created and actively engage (Geleta & Kifle, 2022).

The agriculture business has enormous potential to directly employ and give income to a larger and more disadvantaged portion of the population, while also contributing considerably to national income. Improving the productivity and profitability of agriculture and associated sectors necessitates the use of agribusiness as much as it provides an opportunity (Shuchi, 2019).

4. Conclusion & Future Recommendations

Farmer training is a predictor of agripreneurship since it is a result of both internal and external elements, including personal qualities, financial assistance, training, and market access, among others. All things considered, the project's execution has gone well in accordance with the planned schedule, and the applications that were received to be included in the project are really promising. Along with their cooperative nature, the participants have provided constructive criticism during the project's execution. It is evident from the observations and feedback that the attendees have benefited from this lecture. It was noted that the respondents are of working age, offering promising opportunities for rural development and the provision of agricultural extension services; yet, they exhibited a low level of ICT usage, particularly among female extension workers. It is a good idea to support agricultural policies that seek to increase the participation of both men and women in sustainable land use, water management, and agricultural output. Suggested for the extended seminars that express further on practical, hands-on seminars that will be held soon to further participants' knowledge and expertise in farming crop management. In order to support agro-business ventures and the efficient use of agricultural inputs, the government must provide equal attention to male and female groups by empowering them in land usage and agricultural development. Challenges that aid in the development of the horticulture business, where stakeholders engage with one another and the agro-ecological system, can enhance creativity, social skills, and employability through the investigation of agrotourism destinations influences on the growth of entrepreneur sales in order to boost the economic development of community-based tourism farming. In order to guarantee that the people of Selangor may access high-quality MARDI plant materials, MARDI hopes that this initiative will continue each year.

Declarations

Source of Funding

The study has not received any funds from any organization.

Competing Interests Statement

The authors have declared no competing interests.

Consent for Publication

The authors declare that they consented to the publication of this study.

Authors' Contributions

Both the authors took part in literature review, research, and manuscript writing equally.

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