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Unlocking Food Security Challenges in Malaysia

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The Ministry of Science, Technology and Innovation (MOSTI) of Malaysia envisions biotechnology as one of the key solutions to address Malaysia's food security challenges. Malaysian Bioeconomy Development Corporation (Bioeconomy Corporation), which drives biotechnology growth for economic development under MOSTI, supports this viewpoint. The agency upholds MOSTI's vision by providing biotechnology entities with the necessary resources and support to encourage the development of innovative solutions that can help address the challenges facing Malaysia's food security, including food supply shortages, increased production costs, and surging food prices. Although these biotechnology innovations may not provide a complete resolution of all the issues related to food security, they offer many practical solutions that can significantly mitigate these challenges.

Firstly, biotechnology can lower food production costs by reducing input and raw material expenses. Local biotechnology firms produce alternative protein sources from plants and insects, such as Black Soldier Fly larvae, that are protein-rich animal feed and convert organic waste into protein. This approach reduces reliance on costly imported animal feed like maize and addresses food waste. The global insect feed market is predicted to reach RM9.7 billion by 2031, with the fly larvae segment projected to have the highest revenue and fastest CAGR of 26.5% from 2022 to 2031, as per Allied Market Research. Biotechnology will undoubtedly contribute to this substantial growth.

Malaysian companies are adopting advanced technologies to increase breeding and production of main crops like rice, cucumber, and chili. For instance, molecular breeding enables farmers to identify the best crop varieties without waiting for the

plant to physically grow, while micropropagation methods such as tissue culture allows for the production of planting materials or seedlings without relying on seed germination time. These biotechnology applications save farmers significant time and produce planting materials with desirable traits, such as high yield and disease resistance, leading to increased crop productivity and profitability.

Moreover, biotechnology firms are leveraging palm oil mill waste and agricultural by-products to produce biofertilisers and organic composts that can enhance crop yields by up to 40% by harnessing the power of beneficial microbes. These products increase nutrient availability and revitalise soil health by nitrogen fixation and phosphate and potassium solubilisation. Using biofertilisers and biopesticides can also reduce reliance on harmful chemical fertilisers and pesticides, thus preventing resistance to pests and diseases, soil degradation, water pollution, and greenhouse gas emissions.

Advancements in cellular technology have also enabled companies to develop alternative proteins like seafood and meat in laboratories without conventional farming methods, reducing water consumption, land space, and greenhouse gas emissions. The cultivated meat conference in Kuala Lumpur on March 16 marked a significant step towards securing the future of food in Malaysia. Research and Markets estimates that by 2040, 60% of meat products may be produced in bioreactors and sold in stores and restaurants worldwide. A local biotechnology company plans to set up Malaysiaâ??s first cultivated meat production facility in Penang in 2024, revolutionising the food landscape and offering an alternative option to feed the growing population.

Malaysian biotech companies are making significant strides, but larger-scale implementation is needed for profound impact on food security. MOSTI's National Policy on Science, Technology & Innovation and National Biotechnology Policy 2.0 provide a solid framework, and support for biotechnology growth, but they require effective collaboration and practical implementation by public and private stakeholders. Tax incentives provided to qualified biotechnology companies with BioNexus Status and awareness programmes are helpful, but user engagement is crucial for biotechnology to be effective. Without users, biotechnology will remain theoretical without real-world impact on food security.