

DIRECTIONS IN THE UTILISATION OF CROPS FOR BIO-ENERGY IN MALAYSIA IN RESPONSE TO CLIMATE CHANGE

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Climate change has prompted countries to intensify efforts to utilize crops for renewable bio-energy, where Malaysia is not an exception. The government's seriousness in embarking on production and use of this alternative energy is seen from the establishment of the new Ministry of Energy, Green Technology and Water in April 2009, specifically devoted to focus on efforts to enhance the development of bio-energy from alternative sources. The National Bio-fuel Policy was formulated in March 2006 which envisages research and development, production, use and export of bio-fuel to ensure a cleaner environment, reduce reliance on fossil fuels, and to enhance and stabilize the price of palm oil. Being the most efficient oil crop, oil palm is by far the most highly utilized crop for bio-fuel in Malaysia, although some basic work are also currently being conducted on *Jatropha*, cassava, and sago and nipah palms. Through development of indigenous technologies developed by the Malaysian Palm Oil Board, a desirable level of success has been achieved in production, utilization and export of bio-fuel from palm oil. Advancements have been made in the production of bio-diesel from palm oil, energy for burning and production of bio-ethanol using oil palm biomass from the mills, and methane trapping from palm oil mill effluent (POME) for industrial use. An even more sustainable approach is the utilization of the total oil palm biomass milling by-product for bio-energy.

Research and development on the use of *Jatropha*, a newly introduced crop, as a bio-energy crop is still at its infant stage, with focus on introduction and evaluation for suitable varieties. Although *Jatropha* has the ability to thrive well on marginal soils, research efforts need to be intensified on breeding for suitable varieties, pest and disease control, cultural practices and mechanization, particularly for the harvesting operations. Bio-energy industry in Malaysia faces challenges, which include competition in the price offered by bio-fuel from other oil plant sources, quality of bio-fuel produced and sustainability requirements imposed. This requires even more intensive research and development efforts, including those towards genetic improvement and development of new varieties to meet these specific needs.

Key words: bio-energy, bio-fuel, green technology, oil palm