

COURSE OUTLINE

PROGRAMME TITLE	Oil Palm Biomass Management and Resource Recovery: Turning Waste into Valuable Resources
OVERVIEW (Brief introduction Of the topic)	The Malaysian oil palm industry is one of the world's largest producers of palm oil and generates substantial quantities of biomass throughout plantation and milling operations. Oil palm fronds (OPF), oil palm trunks (OPT), empty fruit bunches (EFB), palm oil mill effluent (POME), mesocarp fibre, palm kernel shell (PKS), decanter cake and boiler ash are valuable biological resources that are frequently underutilized and can be transformed into high-value products through effective biomass management and resource recovery to improve operational efficiency, reduce production costs and create new economic opportunities. Effective biomass management and resource recovery are becoming increasingly important as the industry strives to enhance productivity, optimize resource utilization, comply with sustainability requirements and support circular economy practices. Organizations that adopt integrated biomass management strategies are better positioned to reduce waste, recover nutrients, generate renewable resources and improve overall environmental performance while strengthening long-term business resilience. This programme provides participants with the knowledge and practical understanding required to identify, evaluate and manage oil palm biomass throughout its lifecycle—from generation and handling to processing, resource recovery and value creation. Participants will explore current biomass utilisation technologies, assess suitable management strategies and develop practical action plans that can be implemented within plantation and palm oil mill operations. This programme addresses the growing need for the Malaysian oil palm industry to improve biomass utilization, reduce operational waste, enhance resource efficiency and support sustainable plantation and milling operations. It equips participants with practical knowledge to identify biomass resource recovery opportunities that contribute to improved operational

	performance, cost optimization and circular economy implementation.
LEARNING OUTCOME	Upon completion of this course, participants will be able to: 1. Explain at least seven major biomass resources generated from oil palm plantation and palm oil mill operations. 2. Describe current biomass management practices and at least four operational challenges affecting the oil palm industry. 3. Match major oil palm biomass resources with suitable resource recovery and utilization technologies. 4. Evaluate biomass resource recovery opportunities using technical, economic and environmental considerations. 5. Explain how effective biomass management supports sustainable plantation operations, ESG performance and circular economy practices. 6. Develop a practical workplace biomass management improvement plan for resource recovery within their organization.
DURATION (days)	1 day (7 hours)
TARGET PARTICIPANTS (position/level)	• Plantation Managers • Estate Managers • Mill Managers • Assistant Managers • Mill Engineers • Agronomists • Sustainability Managers • Environmental Officers • Operations Executives • Plantation Supervisors • Plantation Owners • Smallholder Cooperative Leaders
COURSE CONTENT (with submodules)	Module 1 – The Oil Palm Biomass Landscape • 1.1 Overview of Malaysia's Oil Palm Industry • 1.2 Types of Oil Palm Biomass • 1.3 Biomass Generation Across Plantation and Mill Operations • 1.4 Current Industry Challenges • 1.5 Circular Economy Opportunities Module 2 – Oil Palm Biomass Resources and Their Value Potential • 2.1 Oil Palm Fronds (OPF)

	• 2.2 Oil Palm Trunks (OPT) • 2.3 Empty Fruit Bunches (EFB) • 2.4 Palm Oil Mill Effluent (POME) • 2.5 Mesocarp Fibre • 2.6 Palm Kernel Shell (PKS) • 2.7 Decanter Cake • 2.8 Boiler Ash Module 3 – Biomass Collection, Handling and Preparation • 3.1 Collection Methods • 3.2 Transportation • 3.3 Storage • 3.4 Moisture Management • 3.5 Size Reduction • 3.6 Quality Control Module 4 – Biomass Resource Recovery Technologies • 4.1 Composting • 4.2 Vermicomposting • 4.3 Biochar • 4.4 Anaerobic Digestion • 4.5 Biomass Energy • 4.6 Other Emerging Technologies Module 5 – Value-added Products and Biomass Utilization • 5.1 Organic Fertilizer • 5.2 Soil Amendments • 5.3 Renewable Energy • 5.4 Animal Feed • 5.5 Bio-based Products Module 6 – Sustainability and Circular Economy • 6.1 ESG • 6.2 Carbon Reduction • 6.3 Waste Minimization • 6.4 Resource Efficiency • 6.5 Circular Economy Principles Module 7 – Implementation Strategies and Industry Best Practices • 7.1 Economic Evaluation • 7.2 Operational Planning • 7.3 Risk Management • 7.4 Stakeholder Engagement • 7.5 Best Practices Module 8 – Workplace Action Planning • 8.1 Identifying Opportunities • 8.2 Prioritising Projects
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	• 8.3 Developing Action Plans • 8.4 Monitoring Progress • 8.5 Continuous Improvement
LEARNING METHODOLOGIES	Learning Methodologies 1. Interactive Icebreaker and Participant Experience Sharing 2. Interactive Instructor-led Presentations 3. Interactive Lectures Supported by Visual Aids 4. Industry Case Studies and Best Practice Examples 5. Guided Group Discussions 6. Scenario-Based Learning and Problem-Solving Activities 7. Group Exercises and Action Planning 8. Knowledge Checks and Reflection Activities 9. Question & Answer (Q&A) Session