

Moving Forward An Increase In Productivity Through Innovation

By Marziah Ahmad

The palm oil industry in Malaysia has been progressing intensely for the last three decades and is still moving forward. In order to enhance the confine basis of economy and diversify it further to create and generate better economic growth, the palm oil industry has come up with range of products. The products vary from crude palm oil, palm kernel oil, palm kernel cake to oleo-chemical and also a new bio-fuel. Federal Land Development Authority (FELDA) was established on July 1, 1956 under the Land Development Ordinance of 1956 for the development of land and relocation with the objective of abolishing poverty through cultivation of oil palm and rubber. FELDA functions to carry out projects of land development and agricultural activities, industrial and social economy.

Since 1990, FELDA decided to stop the intakes of the new settlers. Government has assigned FELDA to stance their own finance and develop into a statutory body. Therefore, to chart FELDA's next growth in generating their own income to furtherance various developments, FELDA has launched a number of private corporate entities primarily to ensure complete value chain of its core activities. Among the largest bodies by FELDA are FELDA Capital cooperative (Cooperative FELDA), FELDA Global Ventures (FGV) and FELDA Investment Corporation (FIC).

FELDA Global Ventures Holdings Berhad (FGV) is Malaysia's leading global agri-business and the world's largest producer of Crude Palm Oil (CPO). FGV's operations stretch across more than 10 countries in Asia, the Middle East, North America and Europe. They focus on six main business clusters, namely; Palm Upstream, Palm Downstream, Rubber, Sugar, R&D and Agri-Services.

FELDA Agricultural Research and Development Sdn Bhd (FGV R&D) was incorporated on 10 September 2014, leveraging in R&D of palm oil, such as plant breeding, tissue culture, agronomy and crop protection. These efforts led to the increase in yield and efficiency, reduction in production costs, better environmental sustainability and an increase in profits.



Innovation For Better Yield In Agriculture Sector

The management believes that holistic vision that focuses on people leads to innovation. This has inspired their employees at FGV R&D to look at their tasks or jobs from a newer perspective. They are motivated to carry out tasks in a more responsible manner. Not only that, they are encouraged to find new challenges and make their jobs interesting based on their capabilities. These thoughts are instilled in the minds of employees simply because the management believes such strategies and motivation will create more enthusiasm towards work. This will foster creativity and lead to innovation thus improving productivity and commitment towards work. FGV R&D aims to conduct a more extensive R&D activity that represents the upstream, midstream as well as downstream areas which could result in a more value-added, cutting-edge and well-proportioned product. This approach has been highly recommended by S. Palaniappan, the executive director and CEO of FELDA Agricultural Services Sdn Bhd as this is believed to drive FELDA in being the leading supplier of oil palm seeds and seedlings.

FGV R&D believes in innovation as it helps in improving competency at work in any industries including the agriculture sector. Innovation in agriculture not only promises sustainability in food production but also ensures an efficient plantation management for high yields as well as cost reduction. The duration involved in the process of plantation provides an ample amount of time for innovation to take place. Some successful innovation was carried out during plantation and this has resulted in an extension of planting seasons as well as harvesting more yields which are better in taste and quality.

Innovation and Creative Cycle (ICC) has played a significant role in FGV R&D since 2010. Activities in ICC encourage the employees to be more creative and innovative in finding solutions to benefit the palm oil industry as a whole. ICC supports the transformation of FR&D towards being more responsive and innovative in improving quality, timeliness, customer service and cost effectiveness.

With this in mind, an ICC team known as Protect with seven members was established. ICC is not only known for being innovative but at the same time is known for boosting team spirit among employees. In 2014, the team brainstormed to identify the most crucial problem using Affinity diagram and Theme Selection matrix for ICC implementation. Based on the findings, they decided to develop a more systematic pest control for oil palms. This is intended to work towards biological pest control and comply with the Good Agriculture Practices (GAP). They further identified that the difficulty in distributing *Metarhizium Solid Substrate (MSS)* at the oil palm re-plantation areas was the main problem in controlling the breeding of *Oryctes rhinoceros*.



Oryctes rhinoceros is a type of beetle known to exist among plants like coconut trees, palms and oil palms especially in Asia damaging the leaves of the plants. This difficulty resulted an increase in labour cost, time spent for MSS dispersal and led to a high possibility in exposure of venomous animals when working in the plantations.

Better Technique In The Dispersal of MSS For the Prevention of *Oryctes rhinoceros*

In 1990's, the government of Malaysia adopted the zero burning environmental policy that aims to reduce carbon emission which also applies to the all oil palm re-plantation areas. Replanting of oil palm is normally carried out after a period of 25 to 30 years of economic life span. This increases the yield production of palm oil. The policy of zero burning practices has brought farmers to decompose oil palm residues at the existing plantation area. The palm trunk and fronds are chipped and shredded to pieces to allow rapid decomposition of the residues. Within six months of the decomposition period, the breeding of *Oryctes rhinoceros* was anticipated to increase rapidly due to the high soil fertility from the bio degradation of the palm residue. This has lead *Oryctes rhinoceros* to destroy the young oil palms that was concurrently replanted at the same plantation areas.

The distribution of MSS is compulsory in preventing the breeding of *Oryctes rhinoceros* at the oil palm re-plantation areas. MSS is a biological control agent that has widely been used in the agricultural sector. The distribution of MSS appeared to be a difficult task and it was recorded that an average of 9 minutes was needed for the distribution of 1 kg of MSS. Based on

this scenario, the team targeted to reduce the time taken in distributing MSS to 3.71 minutes, amounting to 60 percent improvement.

The team further used the Fishbone diagram and Verification matrix to identify the root causes in the difficulty of distributing MSS. The possible causes were segregated into five main factors namely man, method, equipment, material and environment. They also collected data for verification and concluded that there were five main factors which contributed to the problem. The first factor related to the problem was inappropriate body posture during the dispersal of MSS as the workers were required to bend frequently. The second factor to the issue was the flipping of decomposed palm trunk and fronds which was done to ensure that the MSS is distributed evenly. Next, it was discovered that workers had to climb the decomposed palm trunk and fronds for the dispersal at the middle of the residues. They had also identified that there was a high chance of spilling MSS due to improper storage when the works were carried out. Finally, workers were exposed to the toxic dust of MSS when distributing it to the decomposed palm trunk and fronds.

Based on these five root causes, the team had brainstormed in generating ideas of possible solutions. They had also applied the Pro and Contra matrix in selecting the solutions for implementation. Then, the 5W+1H technique was used to verify the effectiveness of the solutions that drives towards the estimated time of 3.71 minutes in the dispersal of MSS. Table below illustrates the root causes and action taken with regards to the difficulty in distributing MSS at the oil palm re-plantation areas.

Root Cause	Proposed Solution
Inappropriate body posture during the dispersal of MSS	1. GRAPs was designed and developed by the team to ease the task of distributing MSS at the palm oil re-plantation areas. <ul style="list-style-type: none"> • It is an equipment that has gone through three development stages for achieving the target of 3.71 minutes for 1kg of MSS of dispersal • It is used to replace the existing conventional method of distributing MSS at the oil palm re-plantation areas • It can be adjusted to prevent any MSS wastages during the dispersal activity • Components of GRAPs are : <ul style="list-style-type: none"> ◆ Bottle ◆ PVC ◆ 'T' PVC ◆ 'L' PVC 90⁰ ◆ 'L' PVC 45⁰ ◆ PVC connector ◆ Ball Valve ◆ Iron & Weld
Workers had to distribute MSS by flipping decomposed palm trunk and fronds	
Workers had to climb the decomposed palm trunk and fronds for distributing MSS at the middle of the residues	
High chance of spilling MSS due to improper storage	
Workers were exposed to the toxic dust of MSS	

GRAPs TO EASE THE DISTRIBUTION OF MSS



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GRAPs was developed through the implementation of ICC to replace the existing conventional method of MSS distribution at the oil palm re-plantation areas.

The utilisation of GRAPs will be expanded and standardised to other oil palm re-plantation areas that uses MSS for preventing the breeding of *Oryctes rhinoceros*. The cost for developing GRAPs was only RM148 and this equipment is able to speed-up the process of distributing MSS efficiently. This improvement was also included in the existing Standard of Procedure (SoP). In addition to this, GRAPs has eliminated workers' exposure to MSS thus ensuring a safe and healthy work environment. This has indeed led to a more value-added and cutting-edge method of dispersal of MSS activities which ultimately increases productivity of the workers in a whole.

Analysis Of ICC Project In FGV R&D

Before this, FGV R&D had received 967 claims from workers that were related with difficulty in distributing MSS at the oil palm re-plantation areas. After the implementation of GRAPs, the number of claims have reduced to only 12. GRAPs is user-friendly and has improved the time taken to distribute 1kg of MSS from 9.29 minutes to 2.20 minutes. Now, only 38 minutes is required for the dispersal activity for 100 units of re-planting oil palms as compared to 87 minutes previously.

In terms of cost saving, FGV R&D has managed to reduce the operation cost from RM6,286 to RM2,658. About RM3,628 is saved for five consecutive years. Not only that, FGV R&D is able to reduce salary expenses as only 1,500 workers are needed for 15,000 hectare as compared to 3,750 workers previously. This has saved a total of RM86,535 of wages each year. With all these improvements, ICC has indeed increased the productivity performance of FGV R&D. This is very much believed to lead the company towards a higher production with less input utilisation.

COMPARISON BEFORE AND AFTER ICC IMPLEMENTATION

