

# THE GRABBER - AN IMPORTANT DEVELOPMENT TOWARDS REDUCING DEPENDENCE ON LABOUR

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**O**il palm plantations are highly dependent on manual labour. It has been estimated that, on the average, about 50 man-days are required per hectare. In recent years the agricultural sector of the industry has experienced labour shortage problems.

As a result numerous operations including harvesting, and other agronomic activities in the plantations have been significantly affected, with an inevitable fall in oil production. Therefore, PORIM had directed its R & D efforts to resolve the labour shortage problem and to find out how certain operations of the plantation can be mechanized with concomitant saving of manual labour.

## INFIELD TRANSPORTATION

**T**ransporting fresh fruit bunches (FFB) from the field to loading station is one operation which calls for use of labour saving devices. The usual loading practice involves a tractor-trailer team comprising a driver and two loaders.

## DESIGN CONCEPT

Several criteria were considered in the basic design of the grabber including ease of operation, improved productivity and efficiency. PORIM initiated discussions with Jamsa Sdn Bhd, sole agent for the Yanmar mini-tractor, and subsequently commissioned the firm to fabricate one unit for PORIM as a joint effort. The first prototype unit was field tested in a commercial plantation.

## PERFORMANCE TRIAL

After numerous trials and discussions with estate managers, improvements were made to the first prototype. The final implement could grab a maximum of three bunches simultaneously with minimum damage to the fruits. The improved model of this implement was further tested in coastal and inland areas.

Jamsa Sdn Bhd also was able to get full cooperation from another oil palm plantation in Johore to evaluate the grabber's performance on inland soils with undulating terrain. Several other field trials were carried out in commercial plantations. Along with these trials several demonstrations were held for plantation managers to see the grabber at work. From the trials, which were carried out at different locations and during different fruiting seasons, the following results were obtained:

### Performance Comparison: Manual vs Mechanical

Type of Transporter	Output tonnes/day	Operating Costs (\$/hr)	Labor required
Manual Loading (mini-tractor)	18 - 28	2.00 - 3.00	3
Mechanical Loading	24 - 30	2.50 - 3.00	1





These trial results clearly show that while there was an increase of between 7 to 33% in the transportation output, there was also an increase of 16 - 20% in the operating costs. However, labour requirement dropped from three to one worker. Assuming that each worker is paid \$17.00 per day and works for 300 days per year the average savings per year is about \$10,200/=. The current cost of a mechanical loader is \$31,000/=\*. The approximate economic life of one unit is five years, and the payback period is three years; thus the full financial benefit of this system could be seen for a period of two years upon completion of the payback period.

In estates where mini-tractors with trailers are being used for infield transportation, changing to the mechanical loader could reduce the labour requirement by 66%. The reduction in labour requirement is more pronounced in areas where manual transportation is being practised. It is hoped that the implement will be the forerunner of other robotic applications in the oil palm industry.

\* *Inclusive of 20hp tractor and trailer*

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