

# MOTORCYCLE TRAILER: AN IMPLEMENT TO ASSIST OIL PALM SMALLHOLDERS FOR FIELD ACTIVITIES

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**T**he labour shortage problem faced by the oil palm industry also affects the smallholders. The plantation sectors are strong enough to alleviate this problem by mechanizing their field activities. Machines are used not only to replace labour but also to increase productivity and area covered. These machines are expensive and the average smallholder cannot afford to own them. The field activities of transporting fresh fruit bunches (FFB) to roadside collecting points, spreading fertilizer and spraying weedicide are all mechanized and have reduced the number of workers substantially. Emphasis was given to developing these machines for the plantation sector, which could afford the cost. The requirement in these areas for the smallholders' sector was left to the backyard industry to innovate. Cost is the main constraint for developing suitable machines. Realizing this constraint, the Malaysian Palm Oil Board (MPOB) developed a motorcycle trailer for FFB evacuation and other field activities. This implement does not replace workers but helps to ease the field activities hence allowing the workers to work longer hours resulting in increased productivity.

## THE IMPLEMENT

Machines that can replace labour are costly and beyond the reach of smallholders. They require an implement that is affordable and useful to their normal field activities such as FFB transport, weed control and fertilizer application. In the smallholders sector, FFB is usually transported using wheelbarrows, weed control carried out with knapsack pumps and fertilizer applied by broadcasting from plastic pails. These activities are laborious and time-consuming.

Most smallholders own a motorcycle. These motorcycles are for social use as well as for transporting workers to the field. Motorcycles can be manoeuvred very well in the flat and slightly undulating oil palm fields. By fixing a trailer to his motorcycle, the owner can carry a substantial

load. From these observations, a special trailer was designed and developed to suit the smallholders' requirements. These include:

- Ability to be fixed to any model of motorcycle;
- Affordable price;
- Very low maintenance cost;
- Increased productivity;
- Easy handling;
- Being easily removable; and
- Use for transporting general goods.

The first prototype (Figure 1) was designed and tested at Ladang Koperasi Sg. Ambat, Mersing, Johor. The trailer was fixed to a Honda Cub motorcycle with a 70 cc engine. The trailer could carry 10 to 12 bunches of 20 kg. The bucket was made of expended metal and the tyres were the same size as those of a wheelbarrow. This was to reduce the weight as well as the overall cost of the implement. After field-testing the system for a few months, it was found that some loose fruits could go through the expended metal and the tyres caused instability to the trailer. A new design was developed by using metal plate and tyres the same size as those of the motorcycle (Figure 2). The operator carried out further tests at the same place. This new system offered good manoeuvrability and stability.

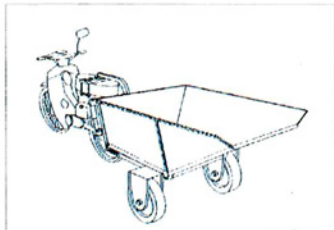


Figure 1. First prototype motorcycle trailer.

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With this system, where the connector is positioned just behind the seat and above the back tyre, the weight transfer is optimized thus giving good traction. This connecting system also allows for a pillion rider. For social use, the trailer could be disconnected.

The bucket has a mechanical self-tipping system for unloading the FFB and repositioning itself on emptying. With this unloading system, the operator need not get out from his motorcycle. The specification of the trailer is given in *Table 1*.

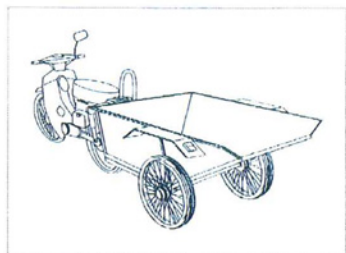


Figure 2. Commercial model motorcycle trailer.

TABLE 1. GENERAL SPECIFICATION OF THE TRAILER

Item	
Trailer total length (including goose-neck)	1 880 mm
Trailer width (including tyres)	1 200 mm
Bucket length	1 200 mm
Bucket width	985 mm
Bucket height	400 mm
Bucket unloading	Manual tipping
Tyre size	2.25 - 17
Trailer weight	40 kg

## FIELD TRIALS

Field trials were carried out at a smallholder's area, which was flat and slightly undulating. The smallholder came to his oil palm field with his motorcycle and a trailer (*Figure 3*). The motorcycle trailer was used to transport the FFB from the palm base to the roadside collecting point. The operator stopped the motorcycle at a convenient location to collect a few bunches (*Figure 4*). He then moved to another location to fill the trailer (*Figure 5*). Once the trailer was full, he went to the unloading site to unload the FFB. By pulling a lever, the bucket automatically tipped (*Figure 6*). Once the bucket was emptied, it positioned itself, ready for the next loading (*Figure 7*). He then moved



Figure 3. Riding motorcycle with trailer to the oil palm field.



Figure 4. Loading FFB into the trailer (by a helper).



Figure 5. Moving to look for more bunches.



Figure 6. Unloading the FFB from the driver's seat.



Figure 7. The bucket will be automatically repositioned when empty.



Figure 8. Looking for more FFB.

TABLE 2. COMPARISON OF PRODUCTIVITY BETWEEN WHEELBARROW AND MOTORCYCLE TRAILER

Means of evacuation	Productivity (t per day)
Wheelbarrow	0.93 - 1.4 (ave 1.16)
Motorcycle trailer	3 - 4 (ave. 4.5)

on to collect more FFB (Figure 8). From these trials, it was found that 3 to 4 t of FFB could be evacuated per day (average bunch weight of 22 kg). This was three-fold more productive compared to the wheelbarrow (Table 2).

In this area, the cost for FFB evacuation was RM 0.40 per bunch. Thus using this motorcycle trailer, the operator could easily earn RM 50 to RM 60 per day. The operating cost (fuel, service and repair of puncture) was found to be about RM 6. Hence the worker earned RM 44 to RM 54 per day.

### THE BENEFIT

The in-house manufacturing cost of the motorcycle trailer (less than 100 units) is in the range of RM 600 to RM 700 per unit. This could be further reduced if the quantity is higher. The cost could also be reduced if the two wheels are made available at a cheaper rate.

The owner could use this system to carry out contract FFB evacuation for other smallholders. If this could be done, the payback period is estimated to be three to four months if RM 10 is put aside per day from the income.

Productivity increased about three-fold. Thus, a three-day job could be completed within one day. As a smallholder, these extra two days could be utilized for other productive activities.

The need for such implement for the smallholders is urgent, as increasingly older people are involved in these activities. The motorcycle trailer could also be used for fertilizer application. Fertilizer could be placed in the trailer and a helper could manually broadcast the fertilizer from the trailer or by walking along the trailer. Thus no manual carrying of the fertilizer is necessary. The trailer could also be used to carry out weed control activity. The toughest task is to carry water, which can now be carried in the trailer in larger quantity, hence improving weed spraying.

The manoeuvrability of this implement in the oil palm field is much better than that of a side tricycle. Its stability and smaller turning radius make the motorcycle trailer a preferred choice. The trailer is easily detachable, enabling the motorcycle to be used for social activity.

The motorcycle trailer is not only useful for smallholders but also for workers in the plantation sector. It is not confined to FFB collection but can be used for other purposes, be it agricultural or industrial.

At this moment this trailer is not roadworthy, as the Road Transport Department (JPJ) has not approved it yet. MPOB is in the process of getting the approval so that smallholders can bring their agricultural products to *Pasar Tani* or *Pasar Malam*, which are normally in town.

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