COMPACT TRANSPORTER FOR IN-FIELD ACTIVITIES

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The field activities of transporting fresh fruit bunches (FFB) to roadside collecting points, spreading fertilizers and weedicide spraying can be mechanized to reduce the number of workers, increase worker productivity and the area covered.

The normal method for transporting FFB is by wheelbarrow, controlling weeds by knapsack sprayer and applying fertilizer. These activities are hard and tiresome. The worker needs an affordable machine to assist his normal field activities. MPOB has developed a small mechanical carrier – a compact machine with single chassis and a carrying capacity of 300 kg. This machine does not displace workers but helps to ease their fieldwork, hence, allowing them to work longer hours and increase their productivity. As the machine is small, working on terraces is not a problem.

THE MACHINE

This Compact Transporter has been modified to make it suitable as an in-field transport vehicle. This single chassis machine with four low-pressure tyres provides good maneuverability in palm rows, narrow terraces, undulating terrain and soggy areas. To a certain extent, this machine is more practical compared to the mini tractor or other off-road vehicles as it can maneuver on all types of terrain and gradients, whilst leaving little impact on the ground.

Some of the modifications were:

- extending the chassis frame (*Figure 1*);
- changing the transmission to double sprocket and chain; and
- installation of a suitable bucket for carrying FFB.

From these modifications, the results are:

- easy to operate/handle; and
- able to carry full load in difficult areas.

Figure 1. Position of transmission – engine and the rear wheel drive.

FIELD TRIAL

Field trials were carried out at MOPB/UKM Research Station and in smallholder areas, where the terrain was flat to slightly undulating. The machine was used to transport FFB from the palm base to collecting points at the roadside. In the process, the operator drives the machine along the harvesting path and stopping to load bunches in the bucket (*Figure 2*). When the bucket is full, the machine goes to the roadside to unload the FFB (*Figure 3*).

Five to seven tonnes of FFB could be evacuated per man-day (average bunch weight of 22 kg). This was a three-fold increase in productivity compared to the wheelbarrow (*Table 1*).

Figure 2. Loading FFB into the bucket.

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Figure 3. Unloading the FFB.

TABLE 1. COMPARISON OF PRODUCTIVITY BETWEEN WHEELBARROW, MECHANICAL BUFFALO AND COMPACT TRANSPORTER

Transporter	Productivity (t per day)	Price of transporter (RM)
Wheelbarrow	0.93 – 1.4 (average 1.16)	<RM 100
Mechanical Buffalo	7 – 10 (average 8.5)	>RM 15 000
Compact Transporter	5 – 7 (average 6)	Estimated at RM 8000

ECONOMIC FEASIBILITY

The Compact Transporter is technically more productive because it can evacuate 6 t of FFB per day compared to only 1.16 t with the wheelbarrow. As such, utilization of this machine should be on a commercial scale. With investment of only RM 8000 and using it for 25 days per month, the purchase of machine is financially viable. For every tonne of FFB evacuated, the operating and maintenance costs were RM 12.50 per day. Using a 10% discount factor, the investment to purchase the Compact Transporter is attractive with a payback period of only seven months. The investment is expected to yield a B:C of 1.44, NPV of RM 4423.69 and IRR of 18% (*Table 2*). As the B:C is greater than unity, the NPV is positive and IRR greater than the opportunity cost of capital; thus, the investment is financially feasible.

TABLE 2. FINANCIAL ANALYSIS

Financial indicators	
Net present value (NPV)	RM 4423.69
Internal rate of return (IRR)	18%
Benefit cost ratio (B:C)	1.44
Payback period (PBP)	7 months

THE BENEFIT

Compact Transporter is a single chassis machine with four wheels, so its stability and maneuverability in the oil palm field are much better compared to a bigger machine with trailer. This machine is not only useful for smallholders but also for workers in plantations. It has multiple uses, not only for FFB collection but also for carrying other products (*Figure 4*).

Figure 4. Multipurpose transporter – used for carrying fertilizer.

CONCLUSION

The machine was found to perform well under any condition such as terraces, undulating terrain and soggy areas. It has good stability and maneuverability. Besides for in-field transportation of FFB, the Compact Transporter can also be used for other activities such as fertilizer application, weed control, field maintenance, *etc*.

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