



## TWO WHEEL TRACTOR NEWSLETTER - DECEMBER 2018



Christmas greetings and best wishes to all for the calendar year 2018.

Internationally, it has been a challenging year, with many new heads of various governments with extraordinary ideas. However small farm mechanisation is moving ahead with some interesting developments in some countries.

It has been some time since the last newsletter (May 2018). However I have been working (albeit slowly) on what are in my opinion the two main challenges for two wheel tractor owners and research workers world-wide.

Two of the main drawbacks of a two wheel tractor are:

- First you have to mostly walk behind it. Farmers on four wheel tractors can sit on a seat.
- Second you have to manually lift the rear of the unit by the handlebars to turn around.

Farmers on four wheel tractors have mechanical or hydraulic lift systems.

So in my opinion farmers will nearly always prefer a four wheel tractor. However 4WT usually cost too much money and are too complex and expensive to maintain properly. The affordable and simple alternative for the small area farmer is a two wheel tractor.

In many of my trips to the developing world I have witnessed comparative demonstrations of various 2WT single row and two row planters. Most have desirable features. However in nearly every case, delegates gravitate towards the Fitarelli two row trailing planter. It always appeals because it has a seat on it.



A Fitarelli trailing two row planter with double disc openers

The Fitarelli is available in two options (either disc opener or tine opener). However it has some significant drawbacks.

- First, it is relatively expensive (up to \$US 4000 landed in East Africa)
- Second, the horizontal flat plate seed meters are barely satisfactory, and perform poorly with uneven seed of varying sizes. There are also limited options for seed rate changes.

- Third- the fertiliser delivery mechanism is basic with relatively few adjustments for accurate rate changes.
- Fourth – the lift system for the soil engaging tools is manual effort by the operator, and can be quite tiring when frequent lifting and lowering is required in small fields.
- A minor disadvantage is the relatively large turning circle.
- It also only has steel press wheels.

On the positive side, it has some ground following ability.

It has provision for changes in row spacing.

A weight box is on the rear to add extra weight for penetration in hard soils.

### **A prototype two row trailing planter for two wheel tractor**



Experimental two row trailing planter for two wheel tractor.

This is an experimental two row trailing planter based on the Fitarelli design that I have been developing for the last year or two. It may also overcome many of the deficiencies of the Brazilian unit.

Some of the main specifications are:

1200mm wide frame with row spacing from 600mm to 1000 mm available.

Chinese vertical cell seed meters fitted with a choice of 12 cell, 18 cell, or 12 cell finger pick-up types.

Chinese fluted roller fertiliser meters which are infinitely adjustable.

Both soil engaging assemblies are spring loaded and have ground contour following capability.

Rubber press wheels fitted. These also act as depth control devices.

An operator seat fitted.

A rotating tool bar arrangement raises and lowers the soil engaging assemblies  
 A ground wheel driven powered lift system is fitted to mechanically raise and lower the soil engaging tools. It is a single revolution ratchet clutch, which is controlled by a trip system



Mechanical lift assembly- it is under the operator seat which has been removed for the picture

Seed and fertiliser drive with clutch. The drive disengages when the tines are raised.



Finger pick-up seed meter



Spring loaded tine assembly (spring compression adjustable)



This is an optional arrangement to lessen turning circle. The drawbar is hinged along its length with the front section rigidly attached to 2WT. It also has the tailwheel fitted. The tailwheel is steered by the operator. The tailwheel can be re-configured as per the pictures of the mounted model shown below.

**Further improvements on the Gongli Africa 3 mounted two row planter for two wheel tractor.**



This unit has undergone several more modifications since the initial report last year. First, it now has a 12 volt linear actuator with a stroke of 100mm and a capacity of 200 Kg to do all the lifting and lowering. However this option is only available if the tractor has an electric start with a battery.



12 volt linear actuator lift



Single revolution mechanical ratchet lift

However most 2WT do not have electric start or battery fitted. The mechanical lift as shown in the trailing model is interchangeable with the actuator, as the tool bar dimensions for both rigs are identical.

Modified tail wheel.



In my initial operation of the Gongli Africa 3 with a standard tail wheel I found it completely unsatisfactory. It was nigh impossible to steer with your feet, as too much effort was required. In addition, with the castoring tail wheel reversing was dangerous. Upon reversing, the castor wheel attempted to spin through 180 degrees, and could cause severe foot damage when attempting to steer by this method.

I decided to convert the tail wheel to a hand operated steering via a conventional steering wheel. I also changed the tail wheel yoke to a non castoring vertical arrangement. As the effort was still excessive, I have incorporated a 4:1 reduction, which decreases the steering effort by 75%. Minor changes in direction can be accomplished solely by using the steering wheel, without the need for steering clutch. Major turns still require the steering clutch to be used.

Note: Both of these rigs are in the prototype stage and have not received extensive field testing. Chain guards will also have to be fitted for safety reasons.

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In my opinion, the trailing two row planter may also have an application in Western countries as a small planter for lifestyle or hobby farmers, or folk on rural residential blocks. This planter could be towed with a large ride-on mower or compact lawn tractor. Tractors with a battery can use the linear actuator lift option, whilst others can use the mechanical lift option.

I will soon be canvassing some local Ag. implement manufacturers to ascertain whether there is any interest in making up a batch of implements.

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This newsletter may be one of the final series. I retired from Australian large scale agriculture in Year 2000, and in 2005 started in foreign aid work. This was initially in South Asia, and then in East Africa. I became interested in small farm implements and tractors which could also be used for zero tillage. This has been principally with two wheel tractors (power tillers). I developed with others some zero tillage seeders for two wheel tractors. I am indebted to many colleagues in South Asia and Africa for their help. I also acknowledge the assistance of Paul Nash Sen. Tech. officer with NSW Dept. of Primary Industries, Tamworth Australia..

I circulated reports on this work to Australian government sponsors and others. However many other folk wanted details of the work, and so the newsletter was introduced in 2011. It now has around 280 subscribers.

In my travels through South Asia and East Africa I have seen many ideas for seeders for two wheel tractor and these have been reported in newsletter. However I have discontinued travel now as I am of senior years (79 years old), so I do not see any many ideas as I saw previously. The issues of the newsletter have slowed down as a result. However, with the latest modifications, I think I have worked out both of the immediate challenges as outlined at the start of the newsletter. However I consider it may be up to others (ag. engineers with design experience?) to further test and develop these basic implements to a consistent product.

If I have any success with local manufacture I will advise

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If you have any comment on this newsletter, please let me know.

Back issues of the 2WT Newsletter can be found at

[:http://conservationagriculture.mannlib.cornell.edu/pages/resources/twowheel.html](http://conservationagriculture.mannlib.cornell.edu/pages/resources/twowheel.html)

Facebook 2WT discussions: (Mike Cottam UK)

<https://www.facebook.com/groups/1609120186059164/>

*Note: This newsletter has been sent in a low resolution pdf. format for those on slow internet connections. If you require the newsletter or parts of it in higher resolution please let me know.*

R. J. Esdaile,  
Agricultural Consultant,  
3 Somerset Place,

SCONE NSW 2337 Australia. Email: [rjesdaile@bigpond.com](mailto:rjesdaile@bigpond.com) [rjesdaile@gmail.com](mailto:rjesdaile@gmail.com) (alternate)

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