TWO WHEEL TRACTOR NEWSLETTER – SEPTEMBER/NOVEMBER 2016

Things have been a bit quiet on the Two Wheel Tractor front in recent months. This has been partly the reason for the delay in issue of this newsletter.

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Current and future ideas for small farm mechanisation in Sub- Saharan Africa.

A recent news and publicity item has recently been released by FAO.
It is entitled '**Full Discussion of the Present situation re Mechanisation in Sub-Saharan Africa'.**
The full text can be found at: http://www.fao.org/news/story/en/item/436847/icode/
The current status of mechanisation is fully discussed, along with the possible prospects for the future. Sustainable mechanization has much to offer in Sub-Saharan Africa. At present 65% of agriculture in this part of the world is carried out by manual labour, 25 % by animal traction and only 10% is mechanised.
Comparable figures for South Asia are 30% manual, 30% animal, and 40% mechanised.
Latin America figures are 25% manual, 25% animal and 50% mechanised.
Some of the barriers to adoption of small farm mechanisation are also reviewed.

The news item points to a more complete study by Brian Sims, Martin Hilmi, and Joseph Kienzle (all affiliated with or employed by FAO) who have produced an excellent research paper with detailed analysis of the situation.
It is entitled: **Agricultural Mechanisation – a key input for Sub-Saharan African smallholders**.
It is published in 'Integrated Crop management Vol 23 (2016).
This link is at: http://www.fao.org/documents/card/en/c/51868c45-4ed7-4733-94ae-751b2e5589f7/
Topics such as affordability, availability, lack of farmer skills, constraints of the private sector, maintenance, repair and hire issues are all mentioned.
Some of the opportunities mentioned are: Sources of equipment, Better use of business models, investment strategies, gender issues, finance, and government involvement.
This paper should be required reading for anyone working in the field of small farm mechanisation in East and West Africa. Check it out.

One of the interesting snippets from the news item caught my attention. I set it out below.

Ethiopia, Ghana, Kenya and Nigeria are all actively studying Bangladesh's experience in agricultural mechanization, which relies heavily on two-wheel single-cylinder diesel tractors that can be adapted to power well pumps, river boats, threshers, mills as well as producing crops. Farmers with access to appropriate use of such smaller-horsepower tractors can operate them with planters that deposit seeds directly into the soil with minimal disturbance, in line with zero tillage or conservation agriculture regimes.

One of the possible alternative strategies for small farm mechanisation in Sub-Saharan Africa is the appropriate use of two wheel tractors, as the first step down the mechanisation path. Of course other strategies can also be evaluated, and applied in areas where circumstances permit. Small and medium size four wheel tractors, and associated implements, either of Western or Asian origin are two cases in point.

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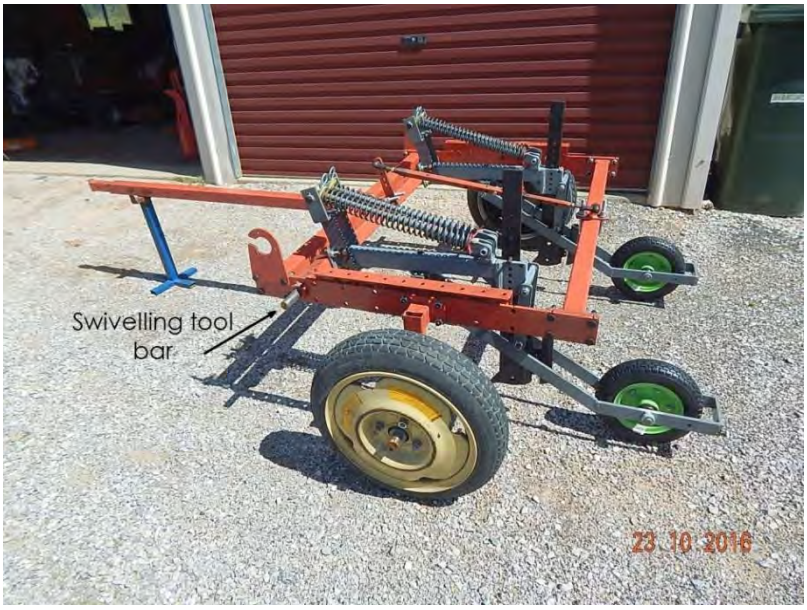
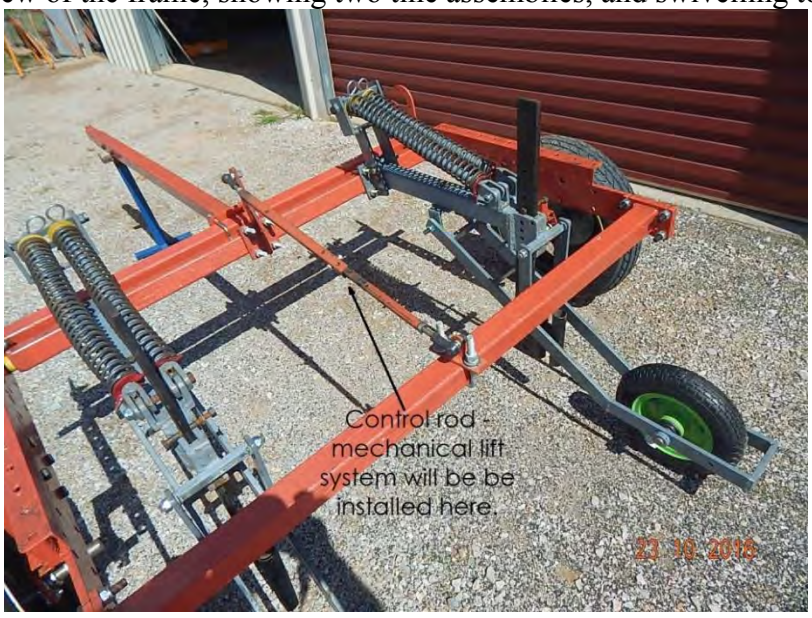
Progress report: Trailing two row planter for 2WT.

Shown below are some pics of the latest design for the Fitarelli two row clone.
This planter has contour following tines (hence the springs), a lift system (swivelling tool bar) and will have a mechanical lift arrangement.
My colleague at the local Ag. Research Station (Paul Nash Snr. Tech. Officer) is making up the lift assembly.
All of the other parts are on hand- Two finger pickup seed meters- courtesy of Syngenta Foundation - and some fertiliser meters as well. The seat will be positioned between the two soil engaging tine assemblies - which will make the overall length shorter (The Fitarelli has the seat in front of the frame). The proposed lift system mechanism will be under the seat. However shields will have to be fitted around the seat to stop moving parts chewing up the operator.

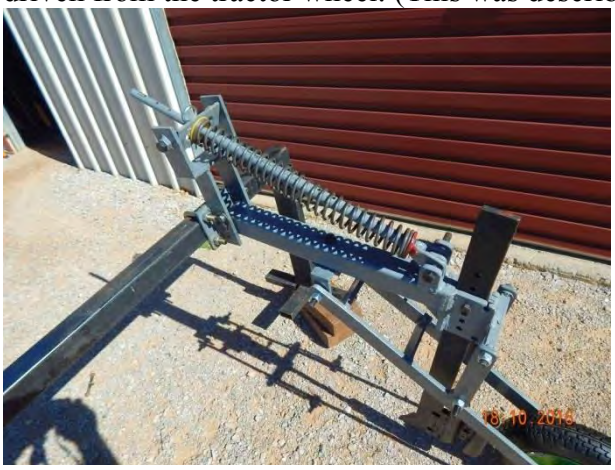
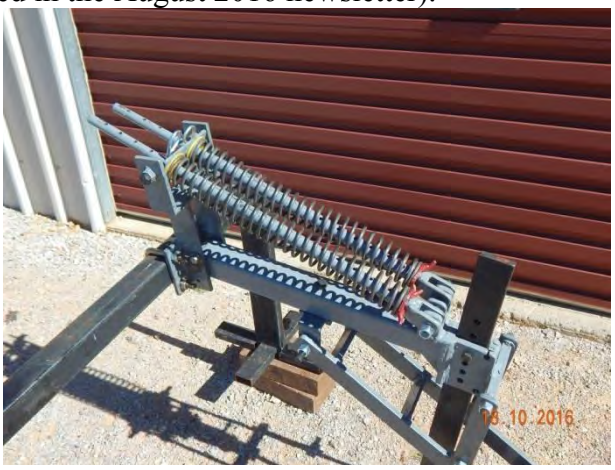


Side view of the frame, showing two tine assemblies, and swivelling tool bar.



The frame in rear quarter view (lift system yet to be fitted)

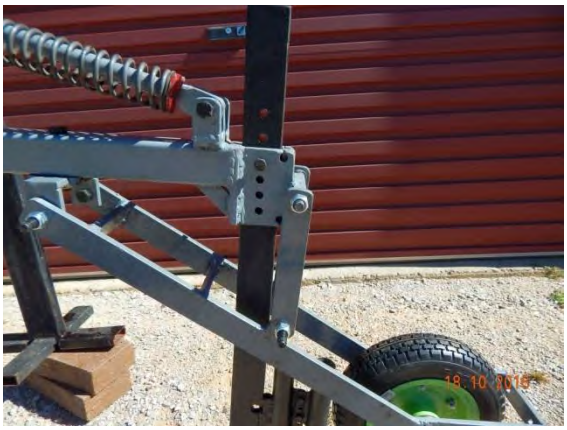
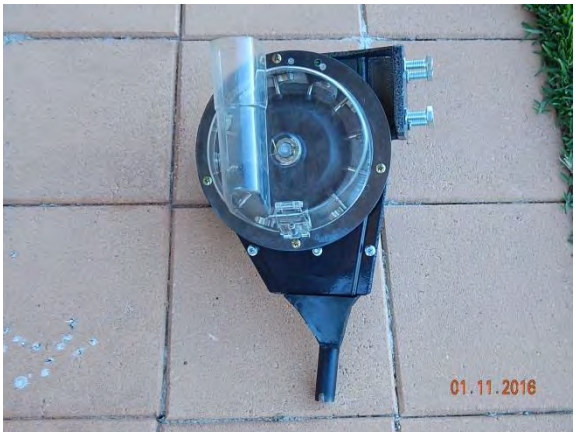
The springs for the tines are the same as those fitted to the mounted model. The mounted two row planter is essentially the same as the trailing unit, except it does not have gauge wheels fitted, and is driven from the tractor wheel. (This was described in the August 2016 newsletter).

Spring loaded tine with single spring (left) and double spring (right)

When the spring design was discussed with a spring manufacturer (located near Toowoomba Queensland) he indicated that he could not design a single spring which would have the compression characteristics that were required, as well as the maximum and minimum length requirement.
He said he could only do it with two springs. This is OK. So now there are two options- double springs for higher down pressure, and single springs for lesser ground pressure.
If the pics are checked. note the adjustment clip at the top (to control spring rod length) and a red lock washer at the bottom of each spring (to control spring rod compression rate).

Another modification from the Fitarelli will be to make the draw bar a two piece unit, hinged on a 66-33 basis. The front section bolted rigidly to the tractor and the rear section free to swivel.
This is nearly complete. Combined with the shorter overall length (due to seat position) the unit hopefully will more manoeuvrable on corners and at the end of the row.

A tine shank showing depth adjustment (left) and a finger pickup seed meter (right)
(The seed meter has a non-standard seed delivery tube.)

Those 50 x 12 tine shanks are adjustable for height and removable, so can be taken out, and single disc or double disc openers installed as alternative units.

It is envisaged that a trailing unit such as this could be used for animal traction, 2WT or small 4WT, large ride-on mower etc. No hydraulics are required.

Total weight is yet to be determined. Hopefully the implement is not too complex and/or too expensive. However all of the options that the farmer and this forum have discussed have with any luck been addressed.
The Fitarelli comes in at $US4000, and hopefully this one will come in at considerably lower price.

There is a possibility that a final year Ag. Eng. Student from University of Southern Queensland may take on the project, and further design this planter so that it is structurally efficient, and meets farm implement design parameters.

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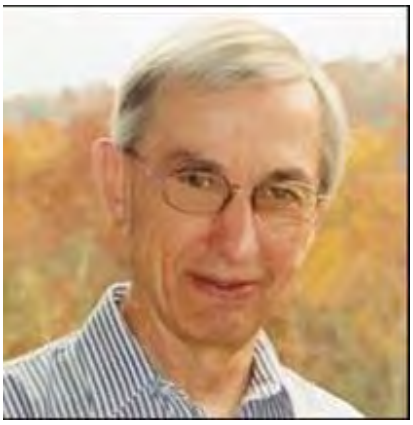
Vale John Morrison.
I was advised recently of the passing of John Morrison, a stalwart advocate of small farm mechanisation in the developing world. John was a well-known US Agricultural Engineer, who worked for around 30 years for USDA in Texas.



John was mainly concerned with conservation farming and seeding techniques on heavy soils in Southern USA. He was also involved in overseas aid work specifically concentrating on CA planters. He was a past president of ISTRO (International Soil Tillage Research Organisation.)
After retirement to Tennessee John developed a single row planter for 2WT. He was a regular contributor to this 2WT forum, as well as participating in overseas R. & D. work in many countries of the world. He will be missed..

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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

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.

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