TWO WHEEL TRACTOR NEWSLETTER - JANUARY 2013

New Year greetings to all of my 2WT colleagues. May the calendar year 2013 be fruitful for us all.

Research and development on 2WT traction units continues, especially with regards to enabling improvement in Conservation Agriculture (CA) techniques with these tractors and equipment to suit.

Two wheel tractor seed drill from Orissa India.
I came across this reference in a recent search through Google.

This seed drill is designed to sow up to three rows of maize. The seed boxes are the inclined plate meter type. It also is priced at Rs.8400 ($US155). However in my opinion it is not suitable for CA applications due to the tine opener layout, and the overall light structural design of the implement.

The complete article can be found at: Pradhan, P. L., Mishra, J. N., Paul, J. C., & Nanda, S. K. (2011). Development and Evaluation of a Power Tiller Operated Planter for Maize. *AMA-Agricultural Mechanization in Asia Africa and Latin America*, *42*(4), 67.
I can email a copy to anyone who may be interested.

University of Southern Queensland, Toowoomba, Australia Student to undertake 2WT project in 2013.

Agricultural Engineering student Mr.Sant Kumar Pratap is to do a project on the adaption of various disc openers to the tool bar of the ARC Gongli 2WT seed drill. Sant is from Fiji and is entering final year of Agricultural Engineering at the University.

Professor Guangnan Chen is the supervisor. Guang is an active member of the 2WT forum, and also supervised Mark Fraser, who did the study on the development of the No till tool bar for the two wheel tractor in 2008. This study has been invaluable in the development of CA equipment for 2WT.

Sant is not confined to any specific type of disc setup, and hopefully will be evaluating cutting disc coulters, single disc openers, double disc openers (both equal size and staggered disc configurations) and perhaps the angled single disc that is ‘pushed’ as developed recently in France by Bruno Vadon of FERT, in cooperation with CIRAD and AFDI. (see next report)

I have some sample disc opener assemblies on hand, and will be taking the 2WT combination to Toowoomba early in the New Year.

Progress with Angled Single Disc opener from FERT.

Bruno Vadon of FERT has supplied me with some photographs of the latest experimental models of seed drills, using this principle.

Angled single disc seed drill (two row) for animal traction (and perhaps 2WT)

Angled single disc seed drill for 4WT

A close-up of the angled disc, showing the seed and fertiliser tubes and the depth/gauge wheel

This disc opener operates on the principle of being 'pushed' through the soil, rather than being 'pulled' as is the case with other disc openers. Some of the force on the disc assembly is downward as well as forward. This purportedly exerts positive downward pressure, lessening the need for springs and/or other pressure mechanisms to give each disc assembly proper penetration. This was explained in more detail in the January/February 2012 issue of the Newsletter.

However I have an unconfirmed report that the two row unit for animal traction (shown above) may have weight difficulties. If that is indeed the case, then some serious weight paring will be required to enable fitting to a 2WT.

Third International Conference on Conservation Agriculture in South East Asia.

This conference was held in Hanoi, Vietnam, in mid December 2012. I was invited to attend a give a demonstration of the ARC Gongli 2WT seed drill at the field day, which was held mid-conference. A seed drill was imported from the manufacturer in China, through the consideration of Mr Sun Liangjun, the export manager of Dong Feng Agricultural Machinery Company of Changzhou.
The seed drill was fitted to a 10.5 HP Vietnamese 2WT, which was used for the demonstration.

As the 10.5HP motor on the Vietnamese unit is much lighter in weight than the 12HP Chinese motor (100 Kg compared to. 150Kg. for a DF-12) a weight box was fitted to the front. It was set up to sow two rows of maize at 75 cm row spacing.

The seed drill was tested in a field where a maize crop of an estimated 3-4 tonnes/hectare had been harvested a few days previously.

The maize residues encountered when attempting to plant the new crop with the seed drill.

Due to the fact that the ARC Gongli was set up in 'tine only' mode, the long lengths of maize stalks severely hampered the operation of the seed drill, and the trial was not a success.

A Fitarelli single row 2WT seed drill was also tested, and was able to handle the long stalks due to the cutting disc that is fitted to the machine.
The ARC Gongli may have performed better if the maize stalks had been in smaller lengths, or chopped. However the main lesson learned is that the ARC Gongli must have a variety of 'high residue' disc cutting or clearing options for fields where maize and/or other high residue material is a significant part of the rotation. Hopefully, the project being started by Mr Sant at USQ (previous report) can also add significantly to the knowledge base on the issue of the use of discs with 2WT seed drills in these situations.

My sincere thanks go to the organising committee of the conference for allowing me to attend and demonstrate the seed drill. I note that the CIRAD Group in Vietnam (Damien Hauswirth) and the CIRAD Group in Laos (Patrice Autfray) each now have a set of staggered double disc openers to fit on their recently purchased ARC Gongli seed drills. We await the results when these units are tested in the field. I will include a pictorial of the 2WT toolbar fitted with various disc alternatives in the next issue.

Other Reflections from 3rd International Conference on Conservation Agriculture in South East Asia

Cropping on steep slopes.

In another part of the Field Day, delegates to the conference were taken to some steep slopes in the Moc Chau province of Vietnam. Here cropping is being practiced using traditional systems (bullocks and plowing) on these sloping lands. Residues are mostly burnt. Farming has moved to steep slopes in Vietnam in recent years due to population pressures.

In my opinion, most of the slopes are too steep for any form of mechanised agriculture, due to tractor operational and safety issues. Unfortunately, recent studies have also shown that soil loss from these areas, using the current traditional system, is of the order of 100 tonnes per hectare annually, and is already impacting on the landscape, and the sediment flows in the river systems. The situation is a real challenge to the research community and others to develop and implement a sustainable system of conservation farming which will stabilise these areas.

The Chinese Li method of planting on sloping land.

This Chinese developed planter (which is partly jab planter- partly digging hoe) was shown at the Field Day

The unit comprises a long handled metal hoe which has a seed reservoir and delivery tube attached. With each significant thrust into the soil, a release mechanism at the base delivers one or two seeds into the hole that has been dug out. This planter works equally well in high residue as well as plowed fields, and also is suited to minimum and zero tillage conditions (although the operator must swing the planter with more effort to dig a hole in a zero tillage field)

At $US25 each the Li planter is worthy of evaluation in fields that are currently planted by hand, and cannot be planted by other means,

Note that this newsletter is in low resolution pdf. Form (due to those with slow Internet connections) If you would like any of the pictures in higher resolution please contact me at rjesdaile@bigpond.com