TWO WHEEL TRACTOR NEWSLETTER – DECEMBER 2016

First of all, a joyous Christmas and a profitable New Year 2017 to all the readers. Keep up the good work!

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Jehiel Oliver, a US citizen involved in aid work in Nigeria, has developed a marketing program for hiring and/or contract work for small area farmers there wishing to avail themselves of a local 2WT contractor. The system is based on the use of apps. and cell phone technology to allow convenient contact between farmer and contractor.
It is all explained in a Youtube video entitled 'Hello Tractor' which can be found at:
https://www.youtube.com/watch?v=ThvEAO7JvZE

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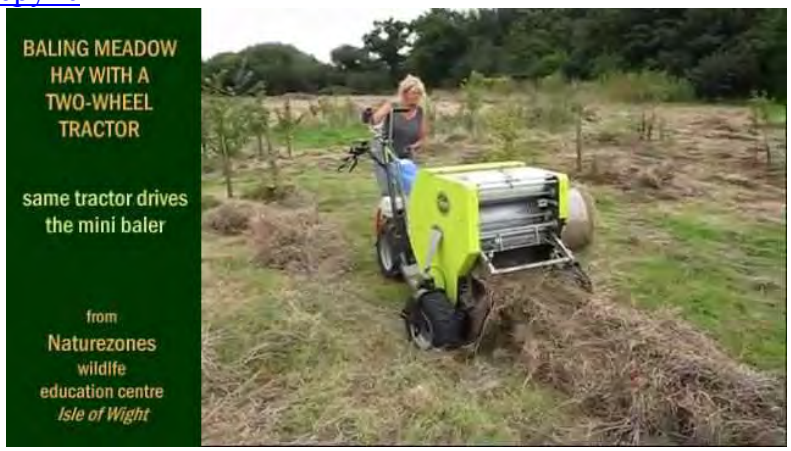
Can a 2WT be used as a traction unit to fit a small baler and bale hay? Please check out the video.
http://www.filmy.olabloga.pl/baling-meadow-hay-with-a-two-wheel-tractor-from-naturezones/0XiIHX6pyEc



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Mike Cottam, an Ag Engineer from England, now has a Facebook page to discuss 2WT subjects with like minded 2WT enthusiasts. This page can be found at:
https://www.facebook.com/groups/1609120186059164/

Also Mike has sent me the link to a new research project, sponsored by Atlas-Copco concerning a n experimental battery powered 2WT. Details can be found at:
http://www.uid.umu.se/en/uid-14/projects/apd/william-van-beek/
http://designawards.core77.com/Commercial-Equipment/49938/OX-1

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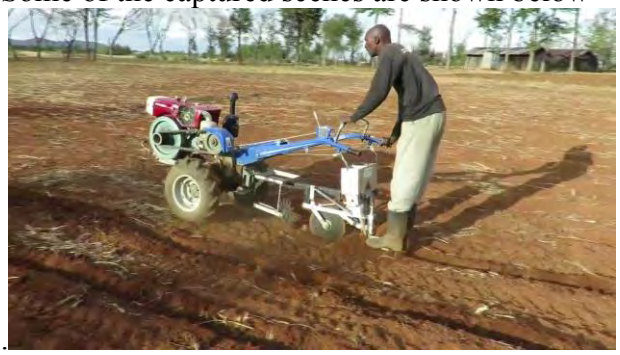
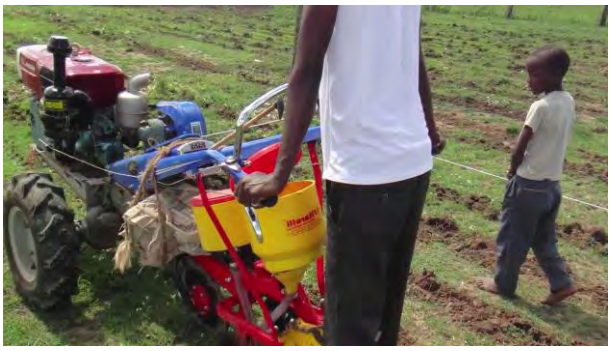
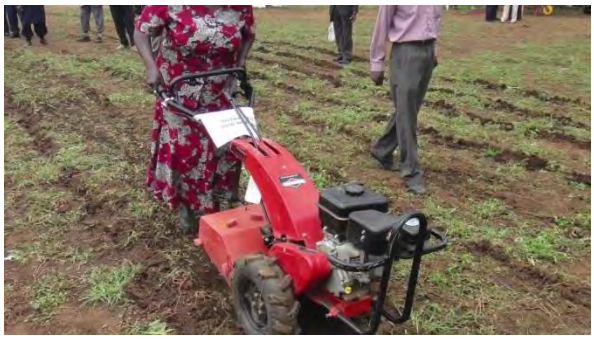
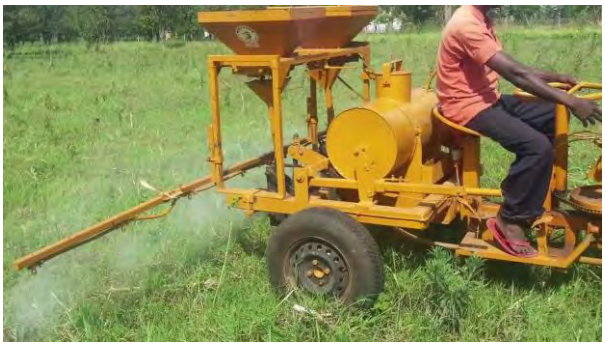
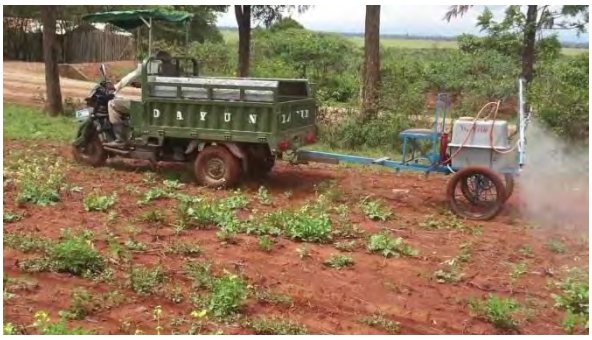
The African Conservation Tillage Network (ACT) has produced an excellent video on progress in Kenya with small farm mechanisation using two wheel tractors. It was mentioned in the latest ACT newsletter. (October 2016)
It can be found at: https://www.youtube.com/watch?v=togiZfnfsnk

The video shows various types of two wheel tractor maize planters in varying soil conditions in Bungona County in Western Kenya. There are also interviews with farmers and workers associated with the project. The video is 13 minutes long and uses 283 MB of space.
Some of the planters being evaluated include the Morrison single row planter, two Fitarelli units (single row and two row models), National Agro 2WT maize planter, ARC Gongli planter, CIMMYT Afro.

two row planter, Chinese rotary strip till planter. Two small sprayer units also are featured in the video. It is well worth a look.
Some of the captured scenes are shown below

Joseph Mutua, Team leader for CA at KENDAT in Nairobi is also an active participant in the development in W. Kenya, by giving instruction and training to local artisans of Bungona county in methods of fabrication of maize planters for 2WT. Joseph was a contributor to the manufacture of the Gongli Africa 2WT planter in Tanzania in 2014, and the Zimbabwe 2WT planter in 2015.

Joseph is also actively investigating the sourcing of affordable quality parts, (pumps, nozzles etc.) to make up various herbicide sprayers for small area farmers in Kenya. (see following item)

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Amir Kassam (Reading, UK) and Saidi Mkomwa (ACT Kenya) have edited a special issue of 'Environments' journal entitled The Role of Conservation Agriculture in Sustainable Production Intensification for Smallholder Farmers in Africa" This discusses various issues relating to the adoption of CA by small farm holders in Africa. It can be found at:
http://www.mdpi.com/si/environments/conserv_agric_Africa
There is a lot of interesting material there, including a full description of the 2WT Strip Till planter developed in Bangladesh by Enamul Haque and his associates.

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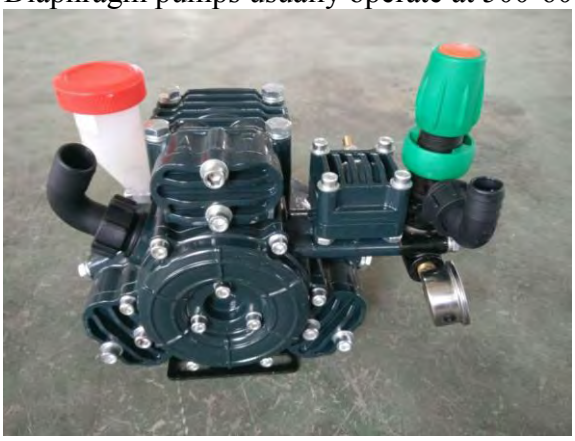
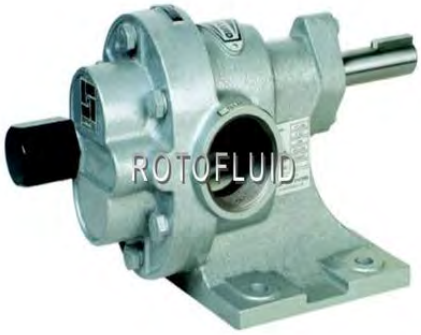
Some options for boom sprayers for 2WT.

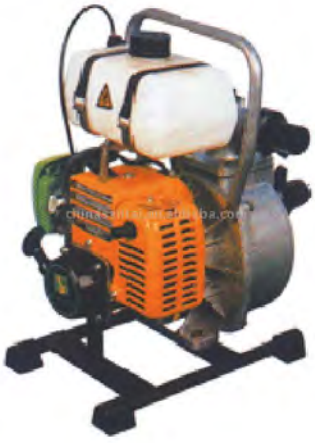
I have set out below some options I have used for boom sprayer setup for 2WT. These may not be the only options open, but may assist R. & D. workers in choice of the appropriate unit to fabricate.

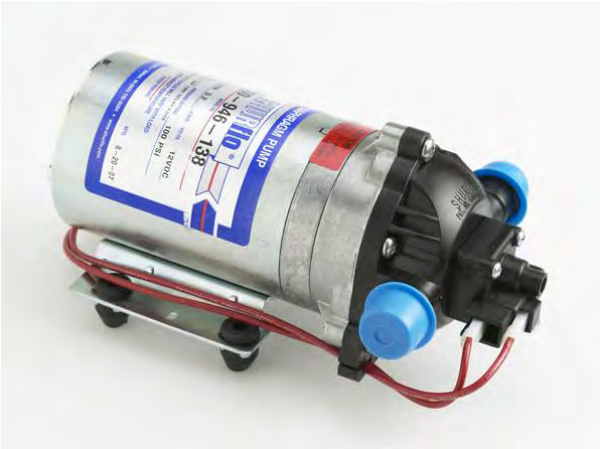
Pump alternatives:
There are several pump types which can be used;
First one can use a diaphragm type as the pumping unit. It can be powered from the optional PTO outlet on the 2WT, an appropriate hydraulic pump connected to an suitable external shaft on the motor or transmission, or by fitting an extra Vee belt pulley to the 2WT motor.
Diaphragm pumps usually operate at 500-600 rpm which is ideal for some outlets.





A small gear pump, which also operates at 500-600 rpm, may be alternative.
Small centrifugal pumps are sometimes used. However they normally operate at 2000-3500 rpm, so need gearing up from some shafts, or a direct drive from the motor.
If no suitable outlet on the tractor is available, then a small 2-5HP petrol motor can be used as the motive power- either a 2 stroke or 4 stroke type. Some countries have small motor/pump combinations available in the market – usually of Chinese origin.

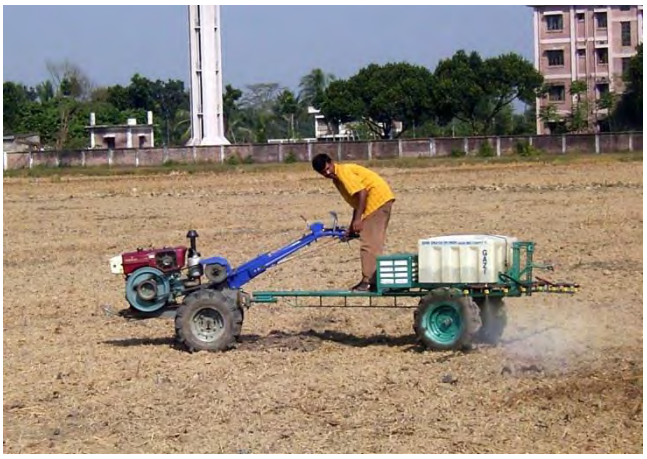




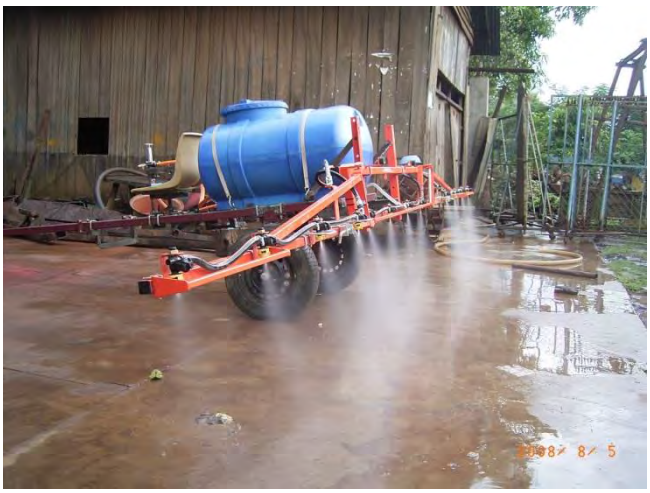
A small compact 12 volt diaphragm pump can also be used. However only 2WT's fitted with an electric circuit and a battery are suitable. The other alternative is to incorporate a large on board 12 volt automotive battery, which must be recharged from the grid at regular intervals.

Pressure Regulator: With all of these pump options a suitable pressure regulator must be incorporated into the plumbing circuit, to ensure a constant pressure at the spray nozzles, and also provide a proper bypass to allow for regular mixing of the spray liquid to avoid uneven concentration in the spray tank.

Here are some pictures of various 2WT boom sprays that I have assisted with fabrication over the years.



This Bangladeshi one is a trailing 8 nozzle unit. It has a 12V diaphragm pump, 150 litre tank, and is on 800mm track. It is powered by an automotive battery which has to be re-charged every few hours. It has a locally made folding boom.



This trailing unit was made in Cambodia in co-operation with CIRAD. It has a centrifugal pump close coupled to a small petrol motor. It has a 10 nozzle Australian made boom, and a locally sourced 300 litre tank.

This Bangladeshi made 9 nozzle sprayer is mounted to the 2WT. The centrifugal pump/integral motor unit along with other controls are fitted to a tray under the handlebars, and the Australian made boom is behind the operator.
I would have preferred to have the spray tank fitted to the tray under the handlebars for compactness and manoeuvrability. However it is nigh impossible to find a spray tank of appropriate dimensions which will neatly fit in that position. This unit worked OK whilst the operator was seated. However the front tank position upsets the balance as soon as the operator dismounts.

The sprayer on the left was fabricated by Joseph Mutua (KENDAT Kenya) and a wheel barrow model on the same principle is shown on the right. A ground wheel drives the hand pump via a chain and pitman arm.

I have found that the main obstacle to sprayer manufacture and expansion in the developing world is the unavailability of parts (pumps, regulators, nozzles etc.) in most countries. Parts from the West are difficult to source and mostly unaffordable. However in recent times several sprayer parts manufacturers from China and India have been located and prices are competitive. Perhaps this may be the way forward in the future.

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Another resource I have found very useful can be found at the link below:
'Herbicide application using a knapsack sprayer' Andrew Miller & Robin Bellinder (2001)
Rice-Wheat consortium of the Indo Gangetic Plains
http://www.knowledgebank.irri.org/csisa/images/FactsheetsAndReferences/references/sprayerenglish.pdf

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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
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.

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