


Women's Tractor Intensive Lesson Plan	Date(s): (2 full days)	Time:	Participants: up to 12 people	Location:
Facilitators:	Interpretation: Interpreters:		Type of Interpretation:	
<p>Learning Objectives:</p> <p>Day 1: Safety and Tractor Operation Overview</p> <ul style="list-style-type: none"> • Participants know the safety procedures associated with tractor operation • Participants know how to recognize and avoid hazardous situations • Participants become acquainted with pre-operational checks and routine maintenance needs • Participants identify the basic parts of the tractor and understand their basic functions • Participants have the experience of starting and stopping the tractor and of driving <p>Day 2: Tractor Operation: Field Practice</p> <ul style="list-style-type: none"> • Participants independently go through the pre-operational checks and identify anything unsafe or in need of maintenance • Participants independently operate a tractor, including practice: <ul style="list-style-type: none"> - Drive straight, reverse, safely make turns, change gears - Hitch and un-hitch implements <div data-bbox="1983 526 2292 824" style="text-align: right;">  </div>				

What & When	Why	How	Whom	Materials
(Activity)	(Goals)	(Method)	(Facilitator)	
DAY 1				
Introduction to topic (15 min)	<ul style="list-style-type: none"> • Explain purpose of the workshop • Participants share their experience with tractors 	<ul style="list-style-type: none"> • Share hopes for the workshop above • Let's find out what experience is in the room. Please tell us your past experience with tractors, if any. You are not expected to come to this workshop with any experience. <i>Teaching assistants should share too.</i> 		

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Tractor Vocabulary/Basic Parts (20 min)	Participants identify the basic parts of the tractor and understand their basic functions	<ul style="list-style-type: none"> Walk around a tractor, identifying the parts. <i>For the parts that are less obvious or confusing, have the parts labeled ahead of time with a tag hanging from each.</i> <table border="1" data-bbox="674 272 1970 711"> <tr> <td>Tires, wheel, axle</td> <td>Clutch</td> <td>Lift arm/rods, top link</td> <td>diptstick</td> </tr> <tr> <td>ROPS, cab</td> <td>Brake/Parking brake</td> <td>Switch, shaft</td> <td>Instrument panel/gauges/indicator lights</td> </tr> <tr> <td>Drawbar</td> <td>Foot throttle/hand throttle</td> <td>Switches, ports, hoses</td> <td>battery</td> </tr> <tr> <td>PTO/PTO cover</td> <td>engine</td> <td>controls</td> <td>Fluids: fuel, engine oil, hydraulic oil, coolant</td> </tr> <tr> <td>Exhaust</td> <td>transmission</td> <td>battery</td> <td>SMV symbol</td> </tr> <tr> <td>Hydraulics</td> <td></td> <td>implement</td> <td></td> </tr> <tr> <td></td> <td></td> <td>Hitch pins/pin clips</td> <td></td> </tr> </table>	Tires, wheel, axle	Clutch	Lift arm/rods, top link	diptstick	ROPS, cab	Brake/Parking brake	Switch, shaft	Instrument panel/gauges/indicator lights	Drawbar	Foot throttle/hand throttle	Switches, ports, hoses	battery	PTO/PTO cover	engine	controls	Fluids: fuel, engine oil, hydraulic oil, coolant	Exhaust	transmission	battery	SMV symbol	Hydraulics		implement				Hitch pins/pin clips			Hanging tags to label parts
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Tractor Safety (60 min)	<ul style="list-style-type: none"> Participants know the safety procedures associated with tractor operation Participants know how to recognize and avoid hazardous situations 	<ul style="list-style-type: none"> Obviously, safety is paramount when operating heavy machinery, and no other machine is more identified with the hazards of farming as the tractor. Knowing the proper safety procedures and how to recognize and avoid hazardous situations is the key. Let's start by covering some of the biggest safety issues associated with tractors, and then we will cover some of the more specific things you should know, such as universal symbols on the tractor and personal protective equipment (PPE) Center of Gravity and Tractor Overturns <ul style="list-style-type: none"> Nearly 50% of tractor fatalities come from tractor overturns. The use of the ROPS and a seat belt can save your life. Center of gravity is the point where all parts of a physical object balance one another. There are 5 main reasons that a tractor's center of gravity moves outside the zone of stability: <ol style="list-style-type: none"> 1. Tractor is operated on a slope 2. Tractor's center of gravity is raised higher from its natural location 10 inches above the rear axle 3. Tractor is going too fast for the sharpness of a turn 4. Power is applied to the rear wheels too quickly 5. Tractor is trying to pull a load that is not hitched to the drawbar 		Handouts: Center of gravity handout References: HOSTA Task Sheet 4.12, 4.13, 4.2 PowerPoint slides?																												

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		<ul style="list-style-type: none"> • Proper and Improper Uses of the Tractor Tractors serve four purposes: <ol style="list-style-type: none"> 1. They are a remote power source 2. They carry/pull machines 3. They move loads 4. They transport materials • Improper Uses of the Tractor <i>(could use PowerPoint slides here to show photos/images)</i> <ul style="list-style-type: none"> - No passengers allowed - Guard the PTO to prevent entanglement - Hitch loads only to the drawbar - If you are stuck or need towing, you will need to be pulled by a second tractor. - Avoid ditch embankments - Avoid obstacles as you operate the tractor - Field conditions that pose special hazards. The operator must know where these obstructions and depressions are located. - High speeds while making a turn can cause an overturn. Make sure brakes are locked together. Reduce speed before entering a turn. - Tractors are powerful, but have limits to their pulling power. Overloading could stall the engine, but rearward overturns can occur as well. - When operating a high-lift bucket with or without a load, keep the bucket as low to the ground as possible while in transport. - Avoid overhead power lines • Farm Equipment Road Use <ul style="list-style-type: none"> • Operating a tractor on public roads creates hazards including traffic situations from slow tractor speeds, wide/heavy loads, potential for spills <ul style="list-style-type: none"> - Standards exist for lighting and marking of agricultural machinery, including: <ul style="list-style-type: none"> - SMV emblem - Headlights (white) - Taillights (red) - Hazard flashers - Turn signals - Reflectors 		

What & When	Why	How	Whom	Materials
		<ul style="list-style-type: none"> • General Practices for Tractors on roads <ul style="list-style-type: none"> - Try to avoid the busiest times of day - Be watchful of others; let high-speed traffic go first - Avoid blind spots if possible - You are responsible for road spills • Runovers <ul style="list-style-type: none"> - 3 types: <ol style="list-style-type: none"> 1. an extra rider falls off (never have passengers as there is only one seat on most tractors) 2. operator falls off or is knocked out of seat (usually can be avoided with ROPs and seat belts). This can also happen while mounting/dismounting tractor, but can be avoided by shutting off the tractor before dismount, and setting the brake or placing it in PARK 3. A person is on the ground near the tractor (often happens in an older tractor that can be started in gear, or if small children are in the area) • PTO Entanglement <ul style="list-style-type: none"> - PTO normally turns between 540 and 1,000 revolutions per minute. - This is much faster than someone can react if caught or pulled into the PTO. - Make sure the PTO is guarded. - Never wear loose clothing or jewelry. • Older Tractors Many do not have modern safety features. Some may have parts that have not been maintained in good working condition 		
BREAK (10-15 min)				
Tractor Safety – PPE (10 min)		<ul style="list-style-type: none"> • <i>Have the necessary PPE on hand to show students, plus hearing protection for each student to use during practice.</i> • Personal Protective Equipment (PPE) • Hearing protection <ul style="list-style-type: none"> - Agricultural workers rely greatly on their ability to hear in order to detect machinery operation problems. For example, experienced mechanics can detect missing or misfiring in engines. 		Reference: HEARING LOSS PROTECTION FOR AGRICULTURAL WORKERS David W. Smith (see footnote) ¹

¹ <http://agrillife.org/agsafety/files/2011/06/HEARING-LOSS-PROTECTION2.pdf>

What & When	Why	How	Whom	Materials
		<p>Tractor operators operating hay balers rely upon sound pitch and sound variations in drive chains as a signal that it's time to oil or lubricate mechanical parts.</p> <ul style="list-style-type: none"> - According to the Occupational Safety and Health Administration, sounds of 85 decibels or higher can damage hearing. ... With each 5- decibel increase, the “safe” exposure time is cut in half. For example, while a tractor at idle speed produces about 85 decibels, a tractor at work will produce up to 100 decibels. - Also, there are requirements for employers to provide hearing protection to workers. (OSHA) <ul style="list-style-type: none"> • Loose clothing – wear comfortable clothing that fits • Sun protection • Eye protection 		
<p>Pre-operation checks – Universal symbols (15 min)</p>	<p>Participants become acquainted with pre-operational checks and routine maintenance needs</p>	<ul style="list-style-type: none"> • <i>Share the usefulness of the operator’s manual and the fact that each tractor is slightly different. Often, the questions you have can be answered in the manual, or at least begin to point you in the right direction.</i> • <i>Give handouts so that students can become familiar with the universal symbols. Then, show where they are found on one or more tractors. Go over what each one means and re-affirm that reading the manual is an important first step in getting acquainted with your machine.</i> • <i>Identify these items on the dashboard: Fuel gauge, engine temperature, RPMs, hour meter, oil pressure, glow plug light</i> 		<p>Handouts: John Deere dashboard and Universal Tractor symbols</p>
<p>Lunch (45-60 min)</p>				
<p>Daily maintenance/Pre-operation checks (60 min)</p>	<p>Participants become acquainted with pre-operational checks and routine maintenance needs</p>	<ul style="list-style-type: none"> • Lights • Tires and wheels <ul style="list-style-type: none"> - Proper inflation - Condition: cracks, cuts and fluid leakage - Lug nut torque - Wheel to rim - Wheel weights • Nuts and bolts: are any loose or missing? <ul style="list-style-type: none"> - Sheet metal - Draw bar and 3-point hitch - Attached implements - Missing pins 		<p>Handout: Pre-operation checklist</p>

What & When	Why	How	Whom	Materials
		<ul style="list-style-type: none"> • ROPS and seat belt • Fluids – proper level and condition <ul style="list-style-type: none"> - Fuel - Engine oil – <i>Show where dipstick is</i> - Transmission/Hydraulic oil – <i>Show where dipstick is</i> - Coolant level – <i>Show how to read the level</i> - Battery - Misc (power steering, transmission, differential) • Operator station <ul style="list-style-type: none"> - Is anything loose left on platform? - Excessive mud or grease? • Instruments – Gauges <ul style="list-style-type: none"> - <i>We'll cover this in the next section</i> • Ongoing maintenance checks for excessive wear or adjustment of: <ul style="list-style-type: none"> - Steering components - Brakes and clutch, parking brake - Hydraulics controls - Differential lock • Grease fittings <ul style="list-style-type: none"> - <i>Show where the grease fittings are on the tractor</i> - <i>Show a grease gun and demonstrate how it is used</i> 		
Driving practice – start/stop (1-1.5 hours)		<ul style="list-style-type: none"> • <i>Demonstration: mounting, starting/stopping</i> • <i>Students have the opportunity to mount the tractor, check surroundings, seat belt, glow plug, fuel pump, safety switches, neutral positions, parking break, hand throttle, warm up</i> • <i>start/stop the tractor</i> 	2 groups of 5-6 students each, working on 2 tractors with 2 facilitators	Hearing protection for each student Handout: Starting/Stopping Tractors
Review/Q & A (30 min)		<ul style="list-style-type: none"> • <i>Time for Discussion/ Q & A</i> • <i>Could also do a reflection or self-test to reinforce skills learned</i> 		

What & When	Why	How	Whom	Materials
DAY 2				
Introduction (10 min)		<ul style="list-style-type: none"> Review the plan for the day Icebreaker or review activity like “What’s one thing you learned that you didn’t know before in yesterday’s session?” 		
Operator’s manual (10 min)		Have a few operator manuals available and ask a few students to find something in them to re-iterate the importance of referencing information about the tractor in the manual		
Pre-operation checks (1 hour)	Participants become acquainted with pre-operational checks and routine maintenance needs	<ul style="list-style-type: none"> Give each student a clipboard and pre-op checklist. With 2 tractors, the group will split and half and half will check one tractor individually filling out the checklist, the other half working on the other tractor. As a large group, go through the 2 checklists, noting anything unsafe or needing routine maintenance 	2 facilitators, 1 to review the checklist for each tractor	2 tractors, each with a couple of things either unsafe or needing maintenance (should be fairly obvious)
Driving practice (1-2 hours)	Participants have the experience of starting and stopping the tractor and of driving	<p><i>Demonstration: Mounting, starting/stopping, maneuver forward and reverse in driving course</i></p> <p><i>Each student gets opportunity to follow driving course 1, working 1-1 with instructor</i></p>	2 groups of 5-6 students with 2 tractors, 2 facilitators	
Lunch (30 min)				
Driving practice (1-1.5 hours)	Participants have the experience of starting and stopping the tractor and of driving	<p><i>Demonstration: Mounting, starting/stopping, driving course</i></p> <p><i>Each student gets opportunity to follow driving course 2, working 1-1 with instructor</i></p>	2 groups of 5-6 students with 2 tractors, 2 facilitators	

What & When	Why	How	Whom	Materials
Driving Practice – hitching an implement and driving with an implement (1-1.5 hours)	Participants have the experience of starting and stopping the tractor and of driving	<i>Demonstration: Mounting, starting/stopping, hitching an implement, driving course</i> <i>Each student gets opportunity to hitch and drive with implement, working 1-1 with instructor</i>	2 groups of 5-6 students with 2 tractors, 2 facilitators	
		Note: I did not include jump-starting a battery or maneuvering with bucket or forks. But, if you think time will allow for it, then let's keep it in		