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# Implementing a National Tractor Safety Program: Using “Whole System in a Room” to Mobilize Partners and Implement Solutions

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## ABSTRACT

Fatalities due to tractor overturns have long plagued the U.S. farm community. Comprising 20% of agricultural fatalities, tractor overturns contribute significantly to high rates of fatal injuries. In the past, many efforts have been directed toward reducing tractor overturns; with one successful U.S.-based program offering rebates to farmers who retrofit their tractors with rollover protective structures (ROPS). In an effort to expand the program, the National Tractor Safety Coalition was formed. This Coalition hosted a “Whole System in the Room” workshop to bring 50 stakeholders together. During this workshop, participants worked together to identify a common vision for the future of tractor safety and ROPS programs and commit to action. At the close of the workshop, Coalition members set out to begin work on 100 short- and long-term commitments to begin implementing a National ROPS Rebate Program.

**KEYWORDS.** Rollover Protective Structures (ROPS), tractor overturns, Whole System in a Room, collaborative action planning, System-wide Collaborative Action for Livelihoods and the Environment (SCALE)

# ***INTRODUCTION***

## ***Agricultural Fatalities and Tractor Overturns***

Farm tractors have, for many years, been the most common cause of agricultural fatalities, contributing to the high rate of fatal injury in this population.<sup>1-4</sup> In 2013, the agriculture sector (<2% of working Americans) accounted for 5% of occupational fatalities and a fatal injury rate of 22.9 per 100,000 workers.<sup>5</sup> Tractor overturns are responsible for approximately 20% of these fatalities.<sup>6</sup>

Tractor overturn fatalities are 99% preventable with the proper use of roll-over protective structure (ROPS) kits,<sup>7</sup> which include a roll-bar or cab and a seatbelt. American Society of Agricultural and Biological Engineers (ASABE) standards were revised in 1985 to state that all tractors manufactured from that time forward “shall” have ROPS.<sup>8</sup> These standards, while voluntary, are followed by manufacturers to prevent exposure to extreme liability. Despite this change, many tractors on U.S. farms are older, and only approximately 51%–59% are equipped with ROPS.<sup>6,9</sup> Barriers to retrofitting ROPS on tractors have long been studied and include low perceived risk,<sup>10-13</sup> financial concerns, and the time required to locate, order, and install ROPS.<sup>14,15</sup>

## ***Retrofit Campaigns***

Numerous attempts have been made to increase ROPS retrofits and decrease overturn fatalities in the United States. Regulatory approaches have not been welcomed by the U.S. farming community;<sup>16-18</sup> as a result, the adoption of ROPS has taken place at a much slower rate than in other countries.<sup>19-22</sup> Attempts have been made to use educational interventions to increase the

number of ROPS retrofits on U.S. farms,<sup>23</sup> but have had limited success as farmers are typically aware of the benefits of installing ROPS, but have limited resources and low perceived risk.<sup>10-13</sup>

At the University of Kentucky, researchers developed a database of ROPS information to help farmers identify the correct ROPS kits for their tractors and to provide information about ROPS retrofitting.<sup>24</sup> Additionally, researchers have sought to ensure reliable supplies of ROPS materials. Ayers and colleagues worked to develop a computerized program that would greatly facilitate the design of new ROPS.<sup>25</sup> In a similar study, National Institute for Occupational Safety and Health (NIOSH) researchers developed and tested low-cost ROPS designs (Cost-Effective ROPS, or CROPS) for 64 tractor models.<sup>26</sup>

U.S. researchers from NIOSH Extramural Agricultural Health and Safety Centers also worked collectively for 2 years toward a nation-wide goal to reduce overturn fatalities.<sup>7</sup> Finally, a social marketing campaign was launched to promote ROPS retrofits in New York. The program utilized tailored messages, significant rebates, and hotline assistance,<sup>15</sup> and it was highly successful, leading to expansion into five additional states.

While efforts to address tractor overturn fatalities have demonstrated opportunities for change and promising approaches, the U.S. still lacks a coordinated approach for putting existing evidence-based ROPS solutions into practice. With approximately 1.7 million U.S. tractors still in need of ROPS retrofits,<sup>6</sup> considerable progress still needs to be made.

### ***Initiating a National Program***

Initiating a National ROPS Rebate Program (NRRP) is a considerable undertaking that requires extensive support and resources.<sup>27</sup> In 2012, Sorensen et al. worked to identify appropriate partners for a NRRP through social networking analysis (SNA) and opinion leader

interviews.<sup>28</sup> Partners were then organized to create the National Tractor Safety Coalition (NTSC) Steering Committee. In an initial meeting of the NTSC Steering Committee, members indicated their support and interest in developing a national solution to address tractor overturns, but acknowledged that this undertaking would require greater consensus and investment from the agricultural stakeholder community at large. Therefore, the Steering Committee organized a Whole System in the Room (WSR) workshop to gather partners and resources for a national tractor overturn solution. WSR uses a collaborative action planning approach that allows participants to work together to develop a joint vision, identify common ground, and facilitate implementation.<sup>29</sup> This method allows participants to get to System-wide Collaborative Action for Livelihoods and the Environment (SCALE) (**Figure 1**) more efficiently than through traditional methods.<sup>30</sup> This article discusses this multi-sector effort to develop a national ROPS installation program in the United States.

## ***METHODS AND RESULTS***

### ***Gaining Consensus and Expanding Opportunities: Mobilizing “The Whole System”***

Forty-six representatives from nine sectors attended the WSR workshop; additional stakeholders later joined the coalition (**Table 1**). The workshop involved self-managed exercises examining the past, present, and future to help participants identify common goals for scaling up current ROPS initiatives. Throughout the event, participants worked in mixed groups (participants from multiple sectors) and single stakeholder groups (participants from one sector only) to accomplish meeting goals.

## ***Step I: Mapping the Context***

Having traditional (e.g., agricultural organizations) and non-traditional partners (e.g., private corporations and media) meant that each individual had a different story and reason for participating in the WSR workshop. Because of this, participants were first asked to “examine the past” by developing joint personal and national timelines, developing stories about each, and thinking about the connections between the stories and the purpose of the meeting. This activity was used to provide a common knowledge base that all participants could work from.

To examine current ROPS and tractor safety issues in a broad context, participants next brainstormed a “mind-map” of trends. A mind-map is a diagram of ideas related to a main topic; branches with related themes are drawn to radiate out of the central topic. In all, 61 trends were identified in the mind-map. **(Figure 2)**

Once the mind-map was completed, each participant was given the opportunity to identify the trends that should be prioritized in the development of a NRRP, first individually, then in specific stakeholder groups, and finally all together.

## ***Step II: Catalyzing Coalitions***

Based on the identified areas of importance, participants in mixed groups developed future scenarios that they would like to actualize and outlined the methods for doing the same. Scenarios were then presented to the entire group and revolved around improved support for agricultural safety and health, better education and data collection, safe and efficient technologies, and an overall improvement in the safety culture on U.S. farms. All groups discussed having an NRRP and a decrease in unprotected tractors in the future.

### ***Step III: Creating Solutions***

Based on the scenarios presented and the projected methods of achieving an ideal future, the group worked to identify six common ground work areas for a NRRP: 1) structure and implementation, 2) coordinated data collection, 3) education and awareness, 4) fundraising, 5) technology and manufacturing, and 6) collaboration (**Table 2**).

Both short- and long-term commitments (**Table 2**) were made by participants based on the common ground areas, allowing NTSC members to take ownership of the program without straying from the group's vision. In addition to making commitments, members of the NTSC divided into task force groups to work on specific components of the initiative.

### ***Steps IV and V: Acting/Creating Value***

Through the NEC and the Steering Committee, NTSC members are given the support needed to fulfill commitments, including networking opportunities, material development, data acquisition, and other resources. To date, major accomplishments by the NTSC include expanded media coverage of the issue (including a NIOSH blog of the WSR workshop), expansion of the program into Massachusetts, expanded coverage of the topic at meetings, development of tractor safety videos, increased collaboration, and increased fundraising efforts.

## ***DISCUSSION***

WSR assumes that even among disparate stakeholders there will be broad agreement on over 80% of the issues and seeks to develop consensus on as many of the details of an initiative as possible. WSR methods have led to the successful implementation of collaborative initiatives in numerous countries, including; community development projects in the U.S., healthcare

reform in Russia, human services programs in Indonesia, and business strategies and education plans from around the world.<sup>31</sup> Prior to the NTSC event, however, WSR had never been used in the United States to address a public health issue. In considering the outcomes from the WSR event described in this paper, WSR methods can be an effective approach for mobilizing partner support.

As demonstrated in the literature, tractor overturns have long plagued U.S. farms. Although recent programs have demonstrated success in increasing the number of ROPS retrofits, existing programs are mainly state-based or regional.<sup>15,32</sup> As with many public and occupational health initiatives, bringing evidence-based programs like these to scale is considerably challenging.<sup>33-36</sup> Among the obstacles preventing research translation in agricultural safety, resource availability, especially financial resources, is often a prominent barrier to successfully completing the cycle.<sup>35</sup>

Thanks to the exercises undertaken in the WSR process, NTSC members have had the opportunity to look at the issue of tractor overturns collectively and to identify areas that all organizations can agree on, as well as program gaps that can be filled by partners. In doing this, these organizations have outlined a path forward and steps for collectively meeting common goals utilizing the various strengths and resources that are provided by numerous, multi-sector groups and organizations.

By sharing resources and focusing on vital elements of the NRRP, it is likely that the struggles of translational research will be overcome. The structure of the NTSC will reduce the financial strain that any one organization would otherwise experience, as well as provide a system of resource sharing that will better facilitate widespread implementation and change.

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TABLE 1: NTSC members by stakeholder group and presence at the WSR workshop

Stakeholder Group	WSR Participants	New NTSC Members
Manufacturers and Dealers	6	2
Agricultural Organizations	7	4
Health and Safety Organizations	8	0
Financial and Insurance Groups	5	3
Government	5	2
Academia and ROPS Experts	10	0
Media	2	1
Private Corporations	1	0
Farmers/Farm Safety Advocates	2	2

Abbreviations: NTSC, National Tractor Safety Coalition ; WSR, Whole System in the Room

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TABLE 2: Common ground areas, stakeholder groups that committed to working in each area, and sample commitments made by NTSC members

Common Ground Area (CGA)	Stakeholder Groups Working in the CGA	Commitment
Structure and Implementation	Agricultural Organizations Academia and ROPS Experts	<ul style="list-style-type: none"> <li>Define structure and leadership of the NTSC</li> <li>Apply for funding to support the infrastructure of a national program</li> </ul>
Coordinated Data Collection	Manufacturers and Dealers Agricultural Organizations Financial and Insurance Groups Government Organizations Academia and ROPS Experts	<ul style="list-style-type: none"> <li>Determine how insurance companies can assist in data collection</li> <li>NIOSH to provide data packages to state and local governments for use and further dissemination</li> </ul>
Education and Awareness	Manufacturers and Dealers Agricultural Organizations Health and Safety Organizations Financial and Insurance Groups Government Organizations Academia and ROPS Experts Private Corporations Media	<ul style="list-style-type: none"> <li>Increase the number of tractor certification courses</li> <li>Create a library of evidence-based, current resources</li> </ul>
Fundraising	Agricultural Organizations Financial and Insurance Groups Academia and ROPS Experts	<ul style="list-style-type: none"> <li>Use networks to contribute to lobbying efforts and raise funds for a national program</li> <li>Develop fundraising materials to share with legislatures, foundations, and NGOs</li> </ul>
Technology and Manufacturing	Manufacturers and Dealers Academia and ROPS Experts	<ul style="list-style-type: none"> <li>Work to improve folding ROPS designs</li> <li>Work to establish an adequate, affordable supply of retrofit ROPS</li> </ul>
Collaboration	Financial and Insurance Groups Government Organizations Academia and ROPS Experts Private Corporations Media Farmers/Farm Safety Advocates	<ul style="list-style-type: none"> <li>Extend the network by reaching out to additional government organizations</li> <li>Reconnect with organizations that were previously involved in tractor safety efforts</li> </ul>

Abbreviations: NTSC, National Tractor Safety Coalition ; ROPS, rollover protective structures

Figure 1: The System-wide Collaborative Action for Livelihoods and the Environment (SCALE) process, from "Going to SCALE"<sup>36</sup>



