



Improving farm safety, one task at a time

An Applied Psychology and Human Factors Approach

Ilinca-Ruxandra Tone

UK (HSE, 2019)

39 Fatalities

x18 Industry average

6 More than last year

Ireland (HSA, 2019)

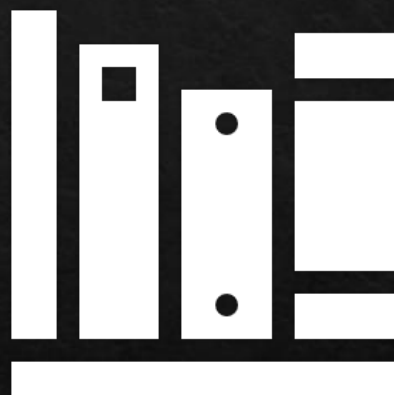
18 Fatalities

! Highest rate

3 More than last year



Team



Research



Tools

NTSAg Team

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NTSAg Research

Applied Psychology
and Human Factors
view on farmer safety

Why do farmers
behave the way they
do?

Produce relevant
empirical findings on
farmer safety

Non-technical skills
(NTS), including
situation awareness
(SA), as well as risk
perception

Improve farmer
safety

Educational
materials and
interventions

NTSAg Research



Project 1

Interview study on non-technical skills in agriculture (NTSAg)



Project 2

Survey study on predictors of NTSAg



Project 3

Vignette study on tractor-related risk perception and management



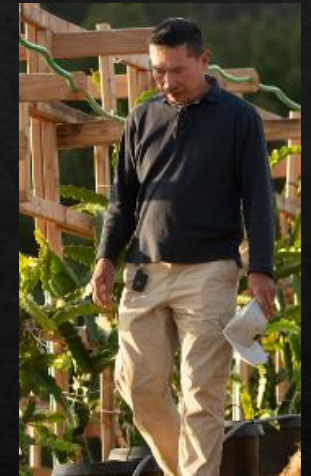
Project 4

Vignette study on cattle-related risk perception and management



Project 5

Survey study on SA requirements and errors for tractors



Project 6

Interview study on the impact of stress and fatigue on SA

NTSAg Research



Project 1

Interview study on non-technical skills in agriculture (NTSAg)



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Survey study on predictors of NTSAg



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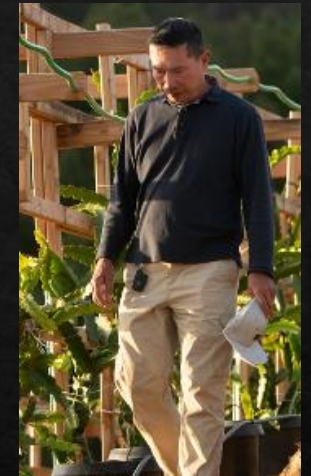
Project 4

Vignette study on cattle-related risk perception and management



Project 5

Survey study on SA requirements and errors for tractors



Project 6

Interview study on the impact of stress and fatigue on SA

Project 4

Cattle handling in high-risk scenarios

High number of injuries caused by cattle

Online survey

8 vignettes, 2 per category of risk

Self, animal, environment, equipment

56 UK and Irish farmers



Project 4


More likely to proceed
when fatigued or
stressed

Less likely to proceed
when dealing with
faulty equipment or an
unfamiliar bull





“Fatigue can impact the decision-making process.”



“Always under stress, you get used to it after a while.”

A man in a plaid shirt and dark pants stands in a field with cows and a yellow wheelbarrow. The scene is set outdoors with trees in the background. The man is holding a wooden stick and looking towards the camera. A yellow wheelbarrow is in the foreground, and several cows are visible in the background.

*“Animal welfare comes first.”
“Has to be done”.*

A man in a plaid shirt and dark pants stands in a field with a cow and a yellow wheelbarrow. The man is on the left, looking towards the camera. A white cow with brown spots is in the center, looking towards the camera. A yellow wheelbarrow is in the foreground. The background shows trees and a cloudy sky.

“If milking is not completed then the farm will lose money.”

“Lone workers do not have a choice”.

A man in a plaid shirt and dark pants stands in a field with cows and a yellow trough. The scene is outdoors with trees in the background.

“I can rest after milking is done.”

*“I would take a strong cup of coffee
and something to eat.”*

A man in a plaid shirt and dark pants stands in a field with cows and a yellow wheelbarrow. The scene is outdoors with trees in the background. The man is holding a wooden stick. The cows are white with some brown spots. The wheelbarrow is yellow and has a wooden frame.

“Often working with animals can make you feel better”.



“Not handle cattle in an extreme stress.”

“Address each issue independently.”

Project 4

Farmers reported
the use of cognitive
non-technical skills

These included task
management and
situation awareness



A man in a plaid shirt and dark pants stands in a field with cows and a yellow sign. The man is on the left, looking towards the camera. In the center, a white cow with brown spots stands behind a yellow sign. The background shows more cows and trees under a cloudy sky.

“You need to organise yourself better to avoid it.”

“A task list to work through.”

A man in a plaid shirt and dark pants stands in a field with several white cows. A yellow sign is visible in the foreground.

“Awareness of where the bull was.”

“Bull seems to be in low mood, so this may be a dangerous strategy.”

Project 4

Stress and fatigue
should be emphasized
more as risks

Situation awareness
should be trained



Project 5

Situation awareness requirements and lapses for tractor operators

SA checklist and user guide

SA – the mental picture of what is going on around you

SA – perception, comprehension and anticipation

SA requirements – different for each industry

SA errors – Level 1, 2 or 3

57 UK & Irish tractor operators surveyed about routines and issues



Project 5

SA requirements ranged from internal cab systems to the status of implements

SA errors mostly occurred at Level 1

Factors leading to SA errors included fatigue and task pressure



Checklists

Can make safety checks more consistent

Enhance safety in other high-risk industries

Act as mnemonic aid

Should cover safety checks for a specific task

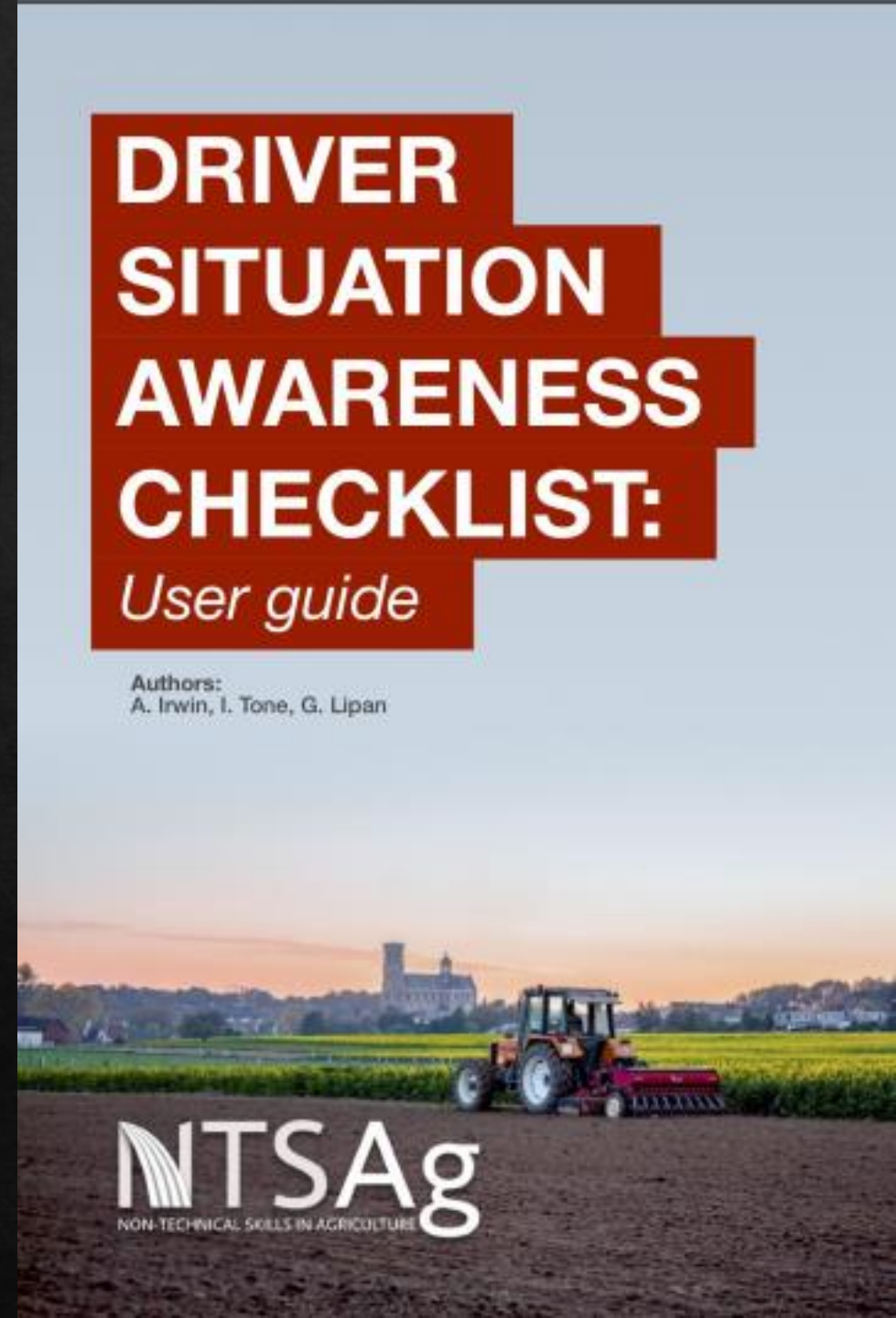
Research and input from several farm safety organisations and farmers

Mobile app in development

DRIVER SITUATION AWARENESS CHECKLIST: *User guide*

Authors:
A. Irwin, I. Tone, G. Lipan

NTS Ag
NON-TECHNICAL SKILLS IN AGRICULTURE



TRACTOR SITUATION AWARENESS CHECKLIST

Are you a safe driver?

KEY CHECKS **PRIOR** TO OPERATION

ENVIRONMENT

- Location of obstacles/obstructions
- Location of other vehicles Light level
- Location of people and animals Weather
- Location of power lines Ground conditions

PERSONAL

- Health/illness Stress level Fatigue level

STATUS CHECK

- Oil, fuel, water levels Tyre pressure
- Brakes Position of switches
- Position of throttle Lights and indicators
- Need for maintenance Faulty parts

TRACTOR PERFORMANCE

- Stability and balance Tractor speed
- Stability and weight of implements

- Security of tractor load/trailer

SAFETY CHECK

- PTO guard & safety chains First aid kit
- Hitch safety & security Mobile phone/radio
- Seatbelt All items secured in cab

SITUATION AWARENESS IS A KEY SKILL FOR ALL DRIVERS.

This checklist should help you enhance the three levels of situation awareness:

PERCEPTION: Noticing what is going on around you.

COMPREHENSION: Using your training and experience to weigh-up the situation.

ANTICIPATION: Thinking ahead to identify potential problems and act to stay safe.

SITUATION AWARENESS REQUIREMENTS (what you need to know before you begin work):

- ✓ Environmental conditions
- ✓ Personal status/health
- ✓ Tractor status
- ✓ Tractor performance
- ✓ Mental map of farm
- ✓ Task requirements

TIPS

TALK: Share information with friends, colleagues and family.

PLAN AHEAD: Think about what you need to stay safe.

CHECK: Your surroundings, equipment and yourself.

SITUATION ASSESSMENT:

The following factors are some of the possible issues that could lead to a loss of situation awareness, increasing the risk of accident or injury.

If any of these issues are present tick the **NO-GO** box and **STOP, THINK** and **TAKE ACTION** to resolve the problem or reduce the issue, before you begin work.

Possible actions might include delaying the task, getting more equipment, fixing broken parts, considering alternative actions, getting more information.

	GO AHEAD	NO-GO
VISIBILITY (can you see everything you need to?)		
Vision in tractor cab (dirty windows, poor mirror placement, view blocked)	<input type="checkbox"/>	<input type="checkbox"/>
Environment (darkness, poor visibility due to weather, glare from sun)	<input type="checkbox"/>	<input type="checkbox"/>
Lighting (tractor lights working, poor exterior lighting)	<input type="checkbox"/>	<input type="checkbox"/>
ROUTE / TERRAIN (do you know the hazards?)		
Road travel (tractor not road worthy, high volume of traffic, long journey)	<input type="checkbox"/>	<input type="checkbox"/>
Terrain (don't know terrain well, possibility of hidden obstacles)	<input type="checkbox"/>	<input type="checkbox"/>
Fixed elements (don't know position of fixed objects such as power lines, barriers etc.)	<input type="checkbox"/>	<input type="checkbox"/>
PERSONAL (are you fit to drive?)		
Illness (headache, blurred vision, nausea, medication side-effects)	<input type="checkbox"/>	<input type="checkbox"/>
Fatigue (tiredness, lack of sleep, long hours)	<input type="checkbox"/>	<input type="checkbox"/>
Safety (lack of first aid kit, no phone or radio)	<input type="checkbox"/>	<input type="checkbox"/>
MANAGING THE TASK (do you have the time and equipment you need?)		
Distractions (loud music, playing games on phone, stress)	<input type="checkbox"/>	<input type="checkbox"/>
Task management (lack of time, rushing, missing equipment)	<input type="checkbox"/>	<input type="checkbox"/>
Tractor (unfamiliar with vehicle, not used implements before)	<input type="checkbox"/>	<input type="checkbox"/>

Created by:

NTSag (Non-technical skills in agriculture), Lantra Awards, Teagasc, & Elizabeth Creed Consultancy
Acknowledgements: Materials developed with advice from IOSH and Women in Agriculture

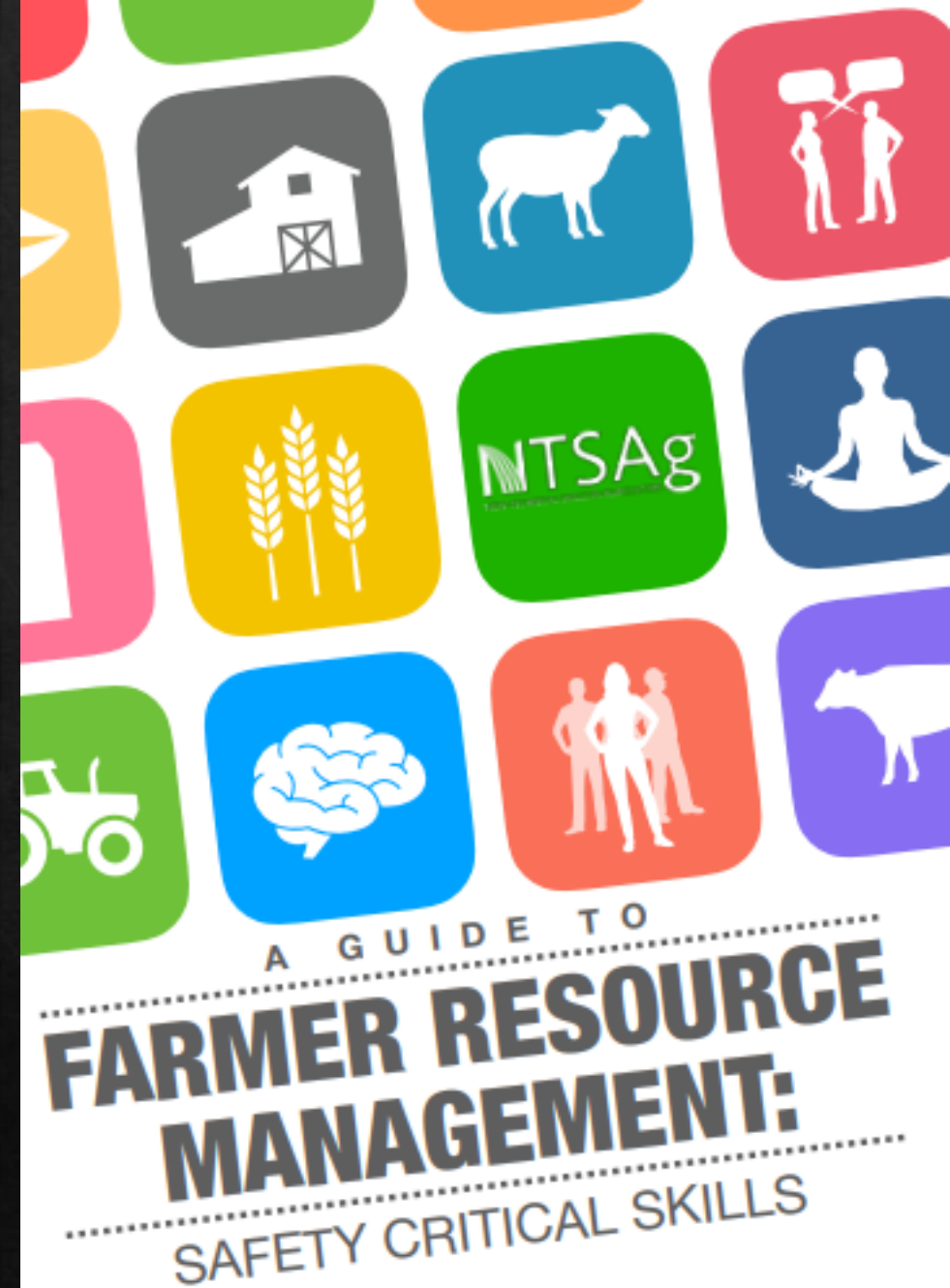
Pocket guide

Covers safety-critical skills

Engaging with materials and taking notes

Offers a starting point in terms of NTSAg

Allows for personalization for each farm



Project 6

The experience of stress and fatigue
in farming

How do stress and fatigue impact
SA

Farm stressors and stress symptoms
can affect safety

Long working hours and sleep
issues increase risk

In offshore drilling, SA is negatively
affected by stress and fatigue

Currently conducting interviews



Thank you very much for your attention!
Any questions or suggestions?

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