River Severn Partnership
Advanced Wireless Innovation Region

Cranfield Water

Advanced wireless sensors for agricultural water management - DSIT and Shropshire Council projects

Jerry Knox

11 September 2025

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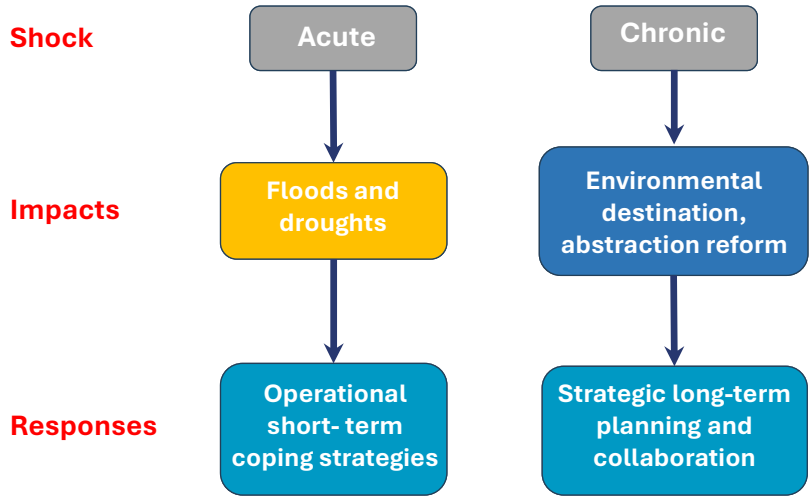
Cranfield Water

Agricultural climate and water-related shocks



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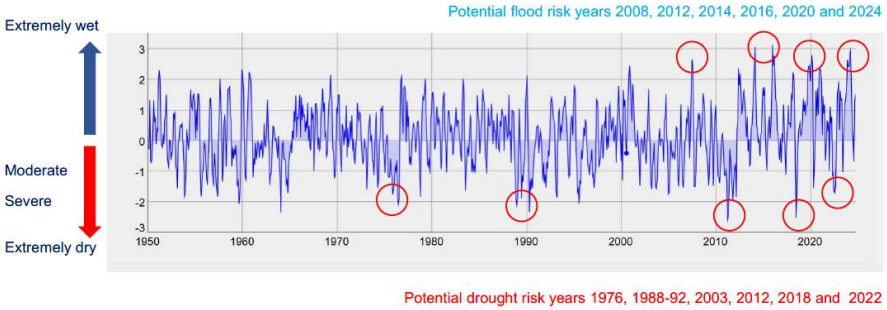
2

Frequency of drought and flood risks increasing

SPEI indicator provides a measure of deviation from the 'average'

Data for Telford 1950-2024

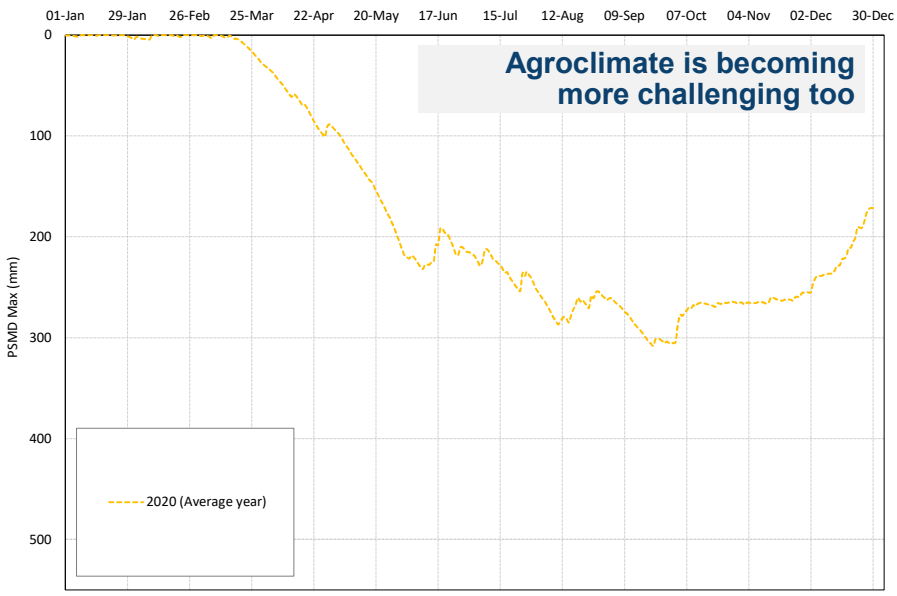


Potential drought risk years 1976, 1988-92, 2003, 2012, 2018 and 2022

3

3

Agroclimate is becoming more challenging too



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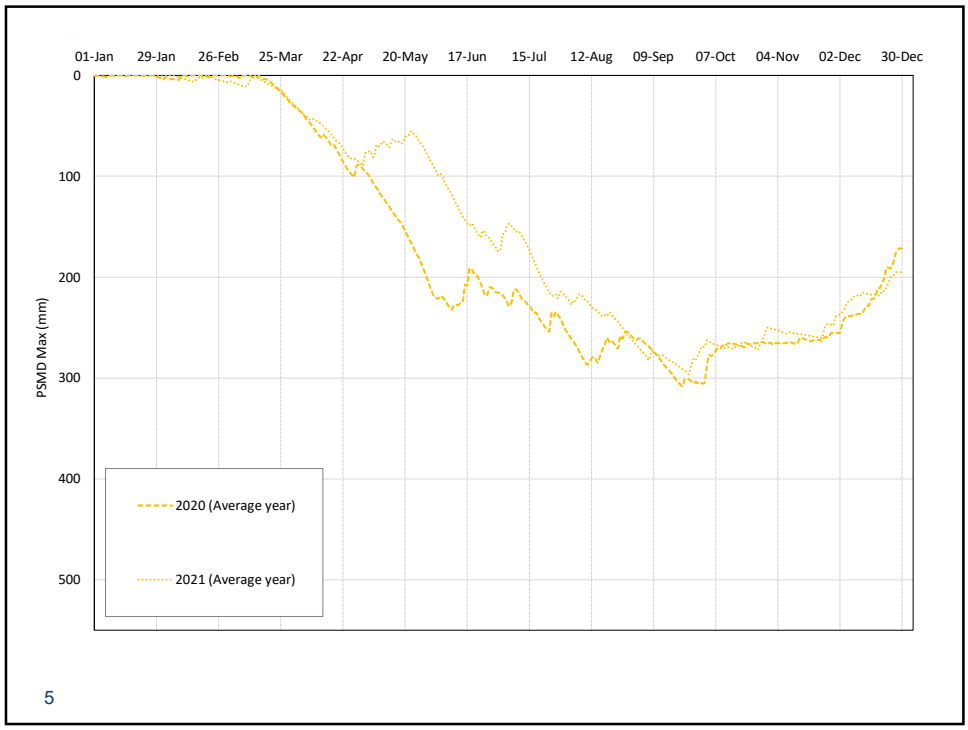
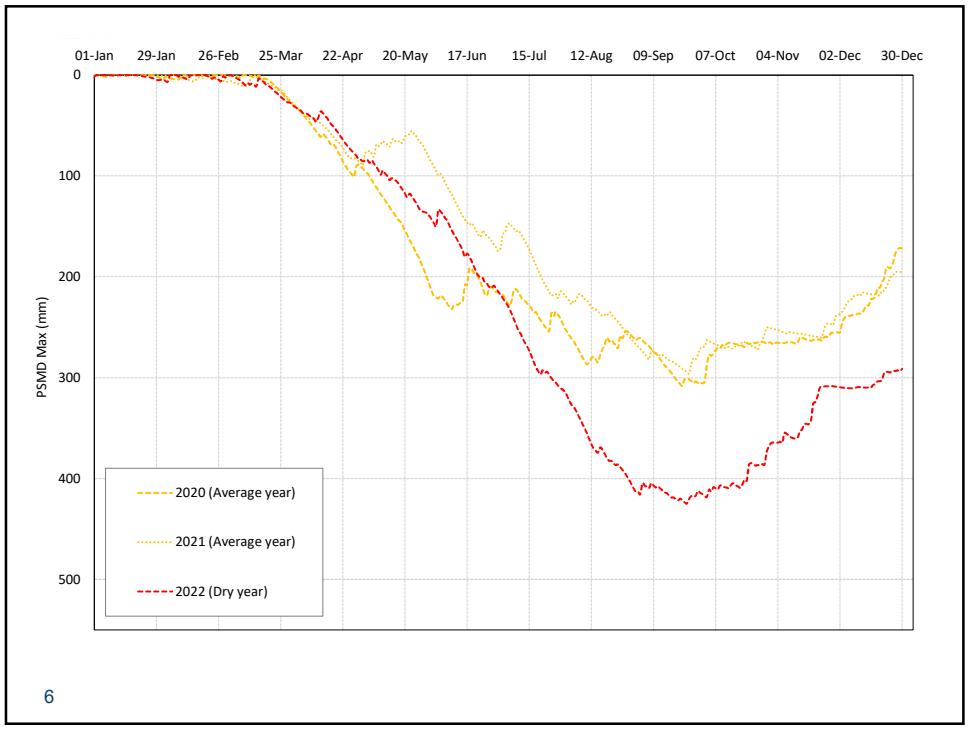

01-Jan
29-Jan
26-Feb
25-Mar
22-Apr
20-May
17-Jun
15-Jul
12-Aug
09-Sep
07-Oct
04-Nov
02-Dec
30-Dec
0
100
200
300
400
500
PSMD Max (mm)
2020 (Average year)
2021 (Average year)
5

5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26-Feb
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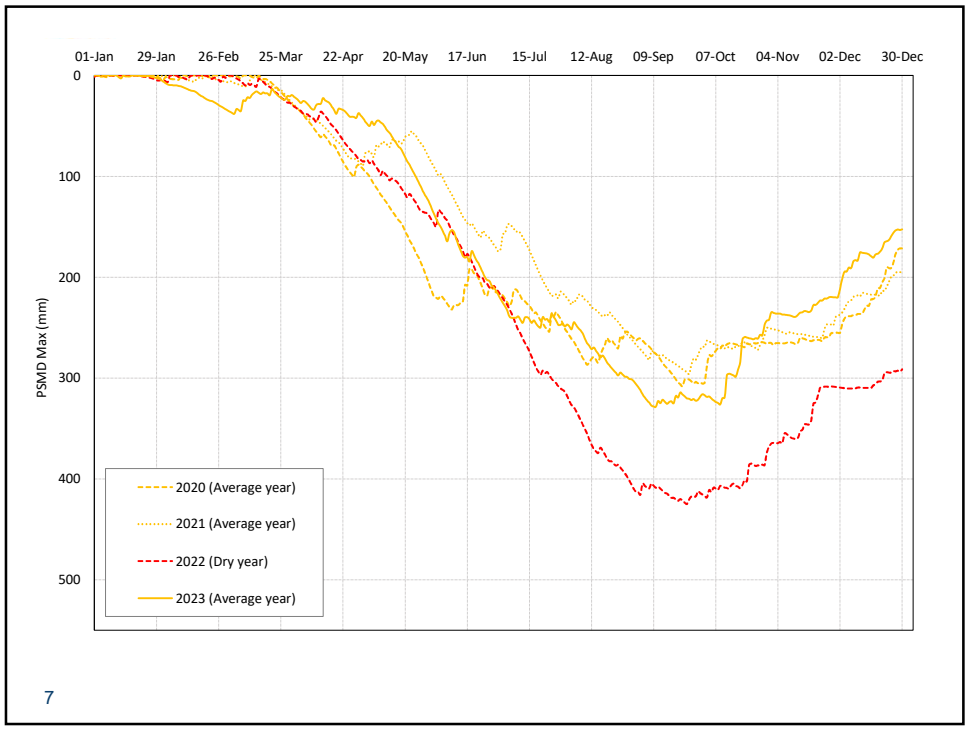
15-Jul
12-Aug
09-Sep
07-Oct
04-Nov
02-Dec
30-Dec
0
100
200
300
400
500
PSMD Max (mm)
2020 (Average year)
2021 (Average year)
2022 (Dry year)
6

6


01-Jan
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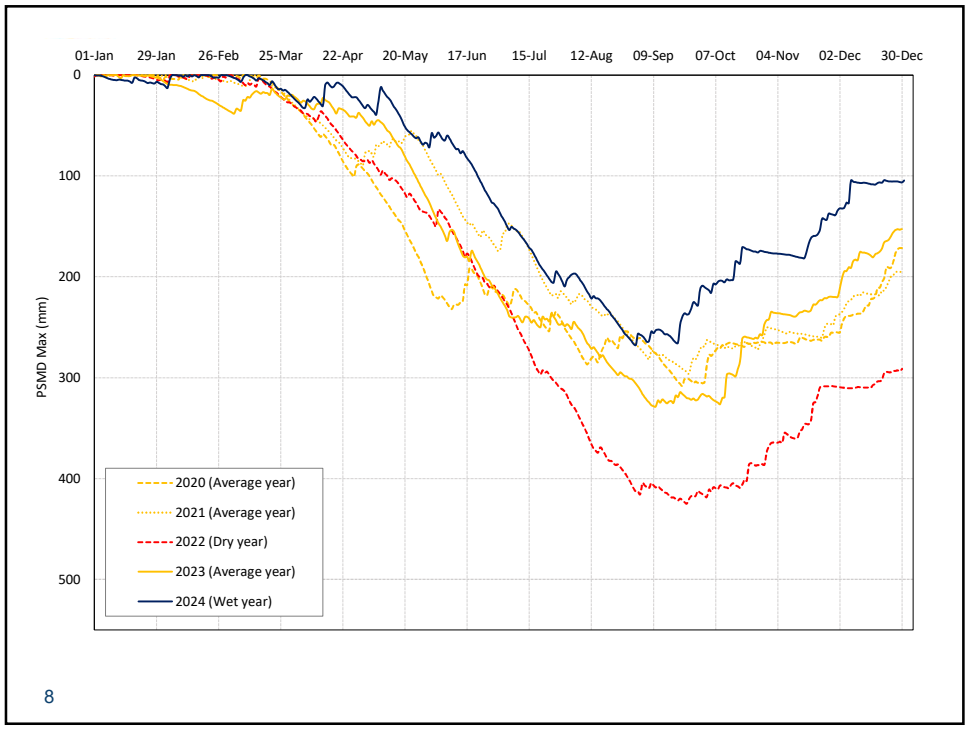
20-May
17-Jun
15-Jul
12-Aug
09-Sep
07-Oct
04-Nov
02-Dec
30-Dec
0
100
200
300
400
500
PSMD Max (mm)
2020 (Average year)
2021 (Average year)
2022 (Dry year)
2023 (Average year)
7

7


01-Jan
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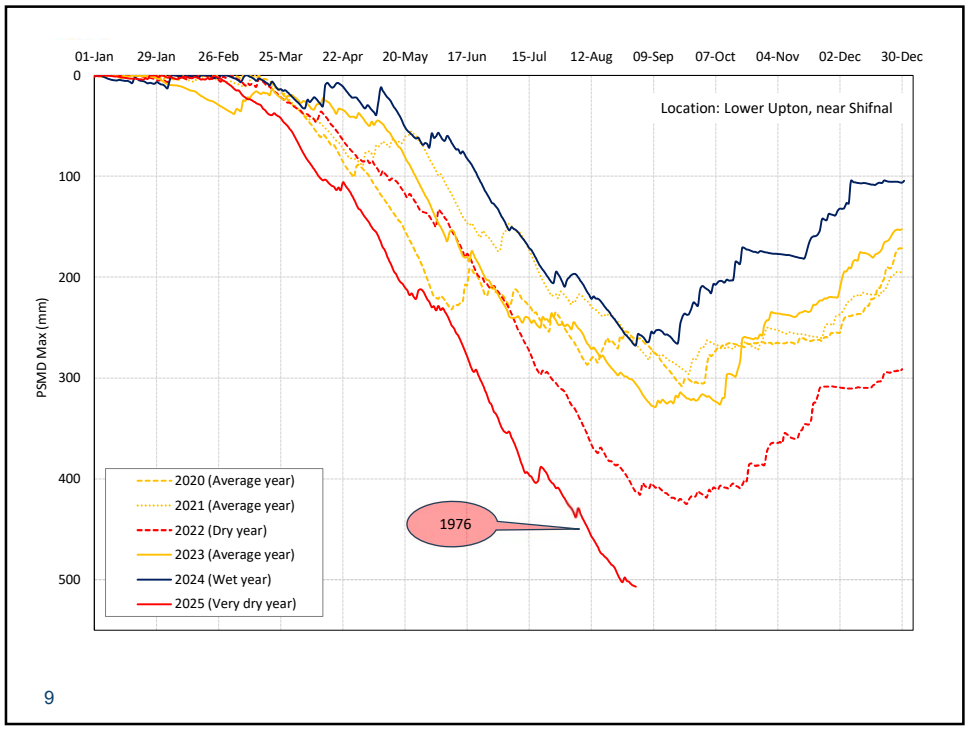
20-May
17-Jun
15-Jul
12-Aug
09-Sep
07-Oct
04-Nov
02-Dec
30-Dec
0
100
200
300
400
500
PSMD Max (mm)
2020 (Average year)
2021 (Average year)
2022 (Dry year)
2023 (Average year)
2024 (Wet year)
8

8


01-Jan
29-Jan
26-Feb
25-Mar
22-Apr
20-May
17-Jun
15-Jul
12-Aug
09-Sep
07-Oct
04-Nov
02-Dec
30-Dec
0
100
200
300
400
500
PSMD Max (mm)
Location: Lower Upton, near Shifnal
2020 (Average year)
2021 (Average year)
2022 (Dry year)
2023 (Average year)
2024 (Wet year)
2025 (Very dry year)
1976
9

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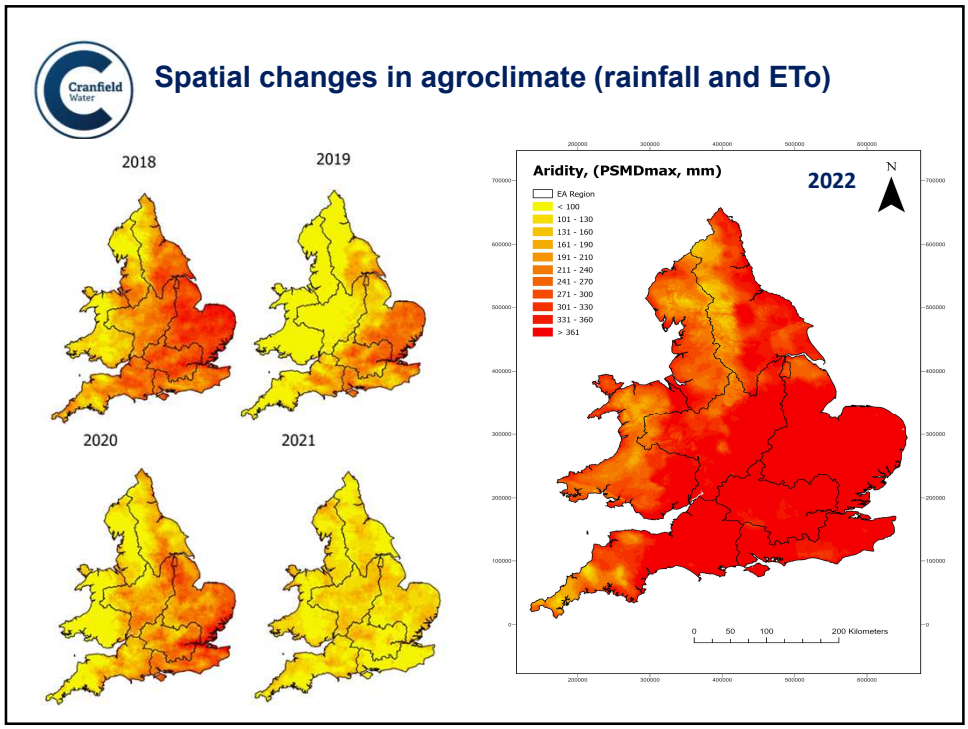
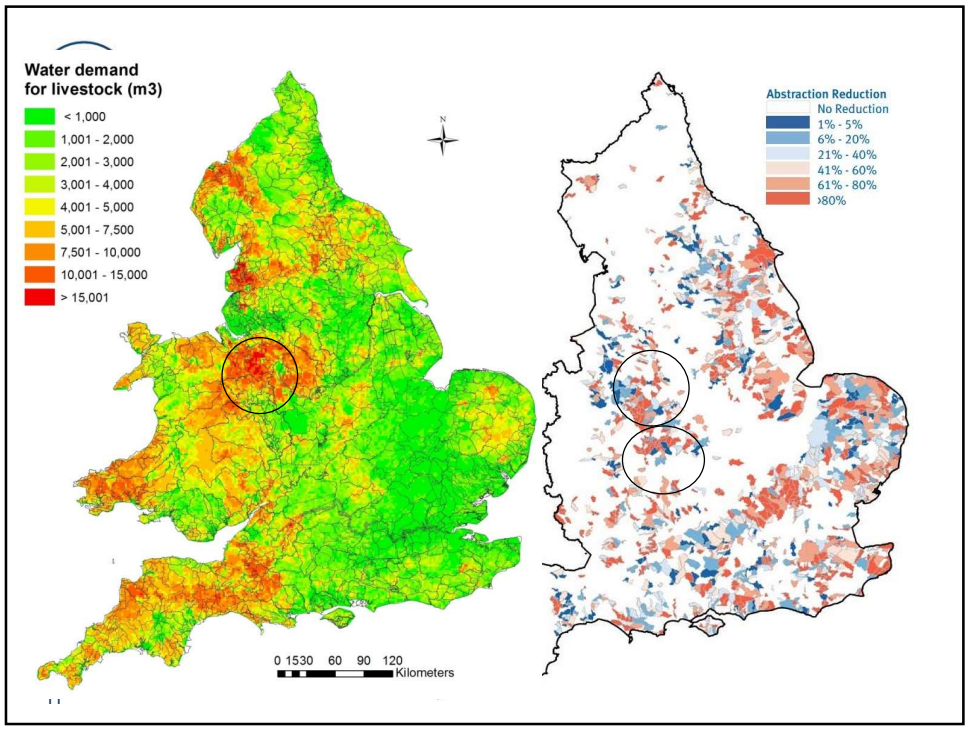
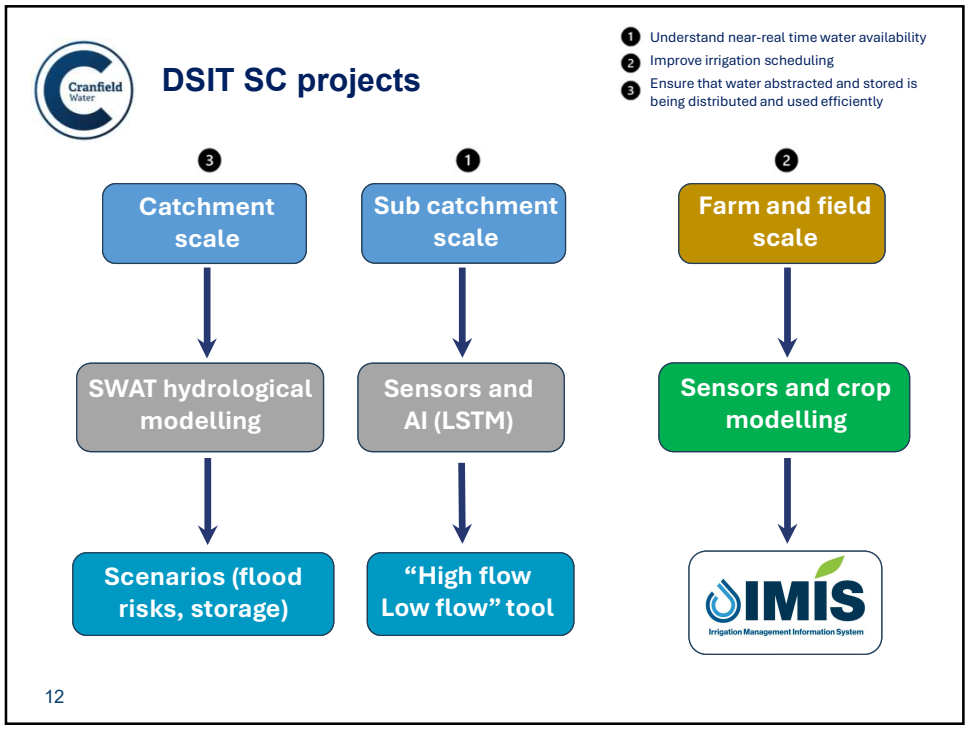

Cranfield Water
Spatial changes in agroclimate (rainfall and ETo)
2018
2019
2020
2021
Aridity, (PSMDmax, mm)
2022
N
EA Region
< 100
101 - 130
131 - 160
161 - 190
191 - 210
211 - 240
241 - 270
271 - 300
301 - 330
331 - 360
> 361
0
50
100
200 Kilometers

10


Water demand
for livestock (m3)
< 1,000
1,001 - 2,000
2,001 - 3,000
3,001 - 4,000
4,001 - 5,000
5,001 - 7,500
7,501 - 10,000
10,001 - 15,000
> 15,001
Abstraction Reduction
No Reduction
1% - 5%
6% - 20%
21% - 40%
41% - 60%
61% - 80%
>80%
0 1530 60 90 120
Kilometers

11


DSIT SC projects
1 Understand near-real time water availability
2 Improve irrigation scheduling
3 Ensure that water abstracted and stored is being distributed and used efficiently
3
Catchment scale
SWAT hydrological modelling
Scenarios (flood risks, storage)
1
Sub catchment scale
Sensors and AI (LSTM)
"High flow Low flow" tool
2
Farm and field scale
Sensors and crop modelling
IMIS
Irrigation Management Information System
12

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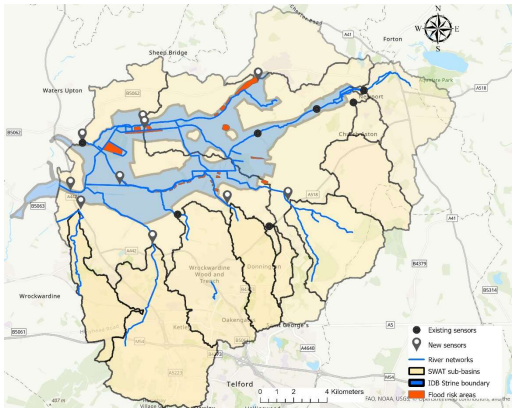
Project case studies

1. Understand near-real time water availability
2. Improve irrigation scheduling
3. Ensure that water abstracted and stored is being distributed and used efficiently

1 3



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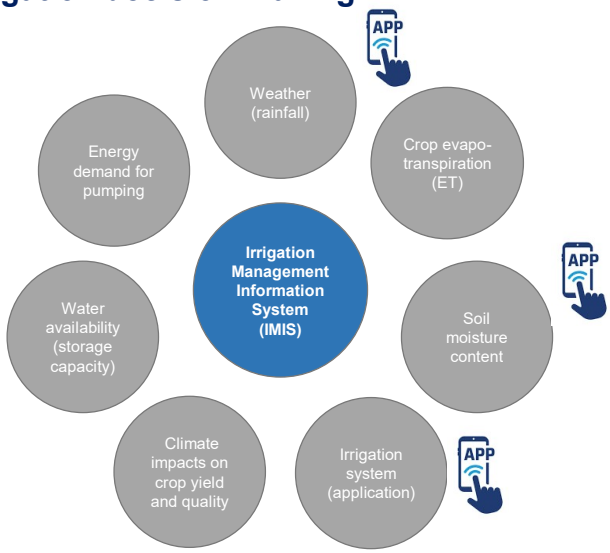
Key components to achieve robust on-farm irrigation decision making



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IMIS delivers integration and advanced wireless sensor connectivity

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Acknowledgements

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