

## A. Annex – ThIRST tool's Input and output value

### A1. Soil moisture

The input values range from 1 (higher soil moisture capacity) to 5 (higher soil moisture deficit).

Soil moisture (Farmer selection)	SMD	Input value used in ThIRST equation
Dry, forms a very weak ball, aggregated soil grains break away easily from ball.	14.2 - 8.3	5
Slightly moist, forms a weak ball with defined finger marks, darkened colour, no water staining on fingers, grains break away.	10.8 - 5.8	4
Moist, forms a ball with defined finger marks, very light soil/water staining on fingers, darkened colour, will not slick.	7.5-2.5	3
Wet, forms a ball with wet outline left on hand, light to medium water staining on fingers, makes a weak ribbon between thumb and forefinger.	3.3 - 0.0	2
Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking, medium to heavy soil/water coating on fingers.	0	1



Figure A1. Screenshot from soil test instruction video conducted by SMS agronomists; Left: Dry, forms a very weak ball, aggregated soil grains break away easily from ball ( $14.2 < \text{SMD} < 8.3$ ); Right: Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking, medium to heavy soil/water coating on fingers ( $\text{SMD} = 0$ ).

## A2. Slope

As the slope gradient of the farm increases, the input value also increases.

Slope gradient/ Angle (Farmer selection)	Input value used in ThIRST equation
Completely flat (Slope = 0 % / angle=0)	1
Gently sloping ( $10 \% \leq \text{slope} \leq 15 \%$ / $5.71^\circ \leq \text{angle} \leq 8.53^\circ$ )	3
Moderately sloping ( $15 \% \leq \text{slope} \leq 30 \%$ / $8.53^\circ \leq \text{angle} \leq 16.7^\circ$ )	6
Steeply sloping ( $30 \% \leq \text{slope} \leq 45 \%$ / $16.7^\circ \leq \text{angle} \leq 24.23^\circ$ )	7
Very steeply sloping (Slope > 45 %, Angle > 24.23°)	8

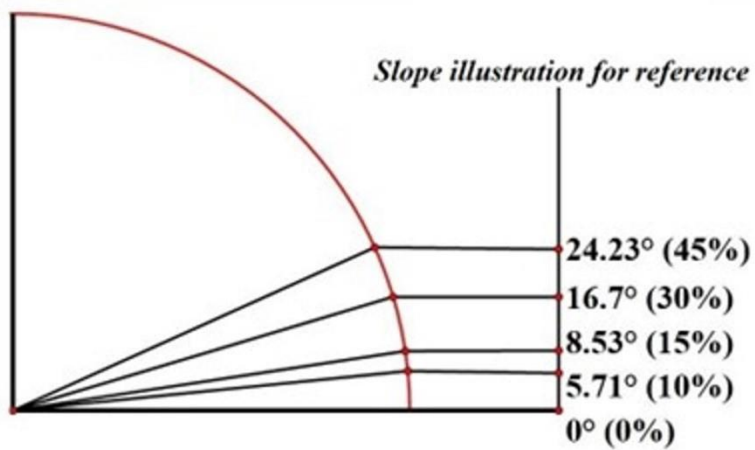


Figure A2. Slope angle illustration used to aid farmers. Screenshot from rtWork app.

### A3. Seasonal forecast

The forecast output from DeRisk SE Asia (<https://deriskseasia.org/climate.html>) is converted into input value for the ThIRST equation.

<b>Precipitation Forecast (Backend)</b>	<b>Input value used in ThIRST equation</b>
80% to 100% chance of exceeding the median precipitation	-2
60% to 80% chance of exceeding the median precipitation	-1
40% to 60% chance of exceeding the median precipitation	0
20% to 40% chance of exceeding the median precipitation	1
0% to 20% chance of exceeding the median precipitation	2

#### A4. ThIRST value output

Recommendation is given based on the ThIRST value calculated by the following formula:

ThIRST value = (1) Soil moisture\*0.8 + (2) Slope\*0.5 + (3) Seasonal forecast\*0.6

ThIRST value	Recommendation given
ThIRST < or = 4	Low ThIRST value: “Based on your farm geography and the upcoming seasonal rainfall prediction, your environments coffee thirst situation is sufficient”
4 < ThIRST < or = 7	Medium ThIRST value: “Based on your farm geography and the upcoming seasonal rainfall prediction: irrigation &/or the preparation for irrigation should be considered”
ThIRST > 7	Large ThIRST value: “Based on your farm geography and the upcoming seasonal rainfall prediction: irrigation &/or the preparation for irrigation should be strongly considered”



Medium ThIRST number: “Based on your farm geography and the upcoming seasonal rainfall prediction: irrigation and/& the preparation for irrigation should be considered.”

**Figure A3.** The ThIRST value is displayed in a traffic light color system, with green, yellow, and red representing low need, moderate need, and high need for irrigation, respectively.

## A5. ThIRST module - rtWork app - English version

WEFOCOS - F...

1. COFFEE FARMS 2. WEFOCOS ADVISORY

WEFOCOS ADVISORY

SOIL STATUS - THIRST MODEL

SHADE TREE ADVICE

WEFOCOS THIR...

SOIL STATUS SURVEY

Address:

Location: \*

Latitude: N 20°59'22"  
Longitude: E 105°49'50"  
Altitude: -3m  
Accuracy: 11.86m

WEFOCOS THIR...

THIRST MODEL

WEFOCOS THIR...

Steps to do soil moisture hand testing

1. Obtain a soil sample at the root zone (30-60cm) using a probe, auger, or shovel;
2. Squeeze the soil sample firmly in your hand several times to form an irregularly shaped "ball";
3. Squeeze the soil sample out of your hand between thumb and forefinger to form a ribbon;
4. Observe the soil texture, ability to ribbon, firmness and surface roughness of ball, water glistening, loose soil particles, soil/water staining on fingers, and soil color.

Which option below best describes your soil moisture? \*

☐ Dry, forms a very weak ball, aggregated soil grains break away easily from ball.

[Watch video](#)

☐ Slightly moist, forms a weak ball with defined finger marks, darkened colour, no water staining on fingers, grains break away.

[Watch video](#)

☐ Moist, forms a ball with defined finger marks. very light soil/water staining on fingers.

☐ darkened colour, will not slick.

[Watch video](#)

☐ Wet, forms a ball with wet outline left on hand, light to medium water staining on fingers, makes a weak ribbon between thumb and forefinger.

Thirst Model

Medium thirst number: "Based on your farm geography and the upcoming seasonal rainfall prediction: irrigation &/or the preparation for irrigation should be considered"

GPS:

11°45'00.0"N 108°03'...  
[View larger map](#)

Slope gradient: \*

☐ Completely flat:  
Slope = 0%  
Angle = 0°

☐ Gently sloping:  
10 % ≤ Slope ≤ 15 %  
5.71° ≤ Angle ≤ 8.53°

☐ Moderately sloping:  
15 % ≤ Slope ≤ 30 %  
8.53° ≤ Angle ≤ 16.7°

☐ Steeply sloping:  
30 % ≤ Slope ≤ 45 %  
16.7° ≤ Angle ≤ 24.23°

☐ Very steeply sloping:  
Slope > 45 %  
Angle > 24.23°

Độ dốc theo chiều

Thank you for completing our survey!

SUBMIT

Figure A4. Screenshots of the ThIRST module inside the rtWork app, English version