**Formulae applied:**

**Soil moisture depletion, SMD or Soil water deficit approach, SWD approach**

Total available water, TAW = (M.Cfc - M.Cpwp )/100 \* drz……………….Equation 1

Where, M.Cfc, pwp – moisture content at field capacity and at permanent wilting point in percent, respectively, drz is the root zone depth.

Allowable depletion, AD = TAW \* MAD……………………Equation 2

Where MAD = management allowable depletion

In our case, M.Cfc = 34%; M.Cpwp =16%; drz = 45cm and MAD = 50%

Thus, TAW = (0.34 – 0.16) \* 45 = 8.1cm (from Equation 1)

Allowable depletion, AD = 8.1cm \* 0.5 = 4.05cm or 40.5mm (from Equation 2)

Soil moisture depletion, SMD = AWC \* drz ………..Equation 3

Available water content or capacity, AWC = (θfc –θpwp) expressed in depth of available water per unit depth of soil profile or layers either in inch/inch or mm/mm or cm/cm or in percent …..Equation 4

dMAD = MAD/100 \* AWC \* drz; dMAD in cm of water ………..Equation 5

SMDfor the whole profile = SMD1 + SMD2 ……...Equation 6

In our case, as we have considered only two depths.

SMD1,2 represents soil moisture depletion from layers 1 and 2 respectively.

The table below shows only 1st day data for the node

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Day | Layers | depths(cm) | M.C.fc | M.C.present |
| 1 | 1 | 0- 22.5 | 0.34 | 0.29 |
| 2 | 22.5-45.0 | 0.34 | 0.33 |

Similarly, the successive day’s data can be obtained in such a tabular form.

SMD for day 1: SMD1 = AWC1 \* drz1 (from Equation 3)

SMD1 = (0.34-0.29) \* 22.5cm = 1.098cm or 10.98mm (calculated in 4th column of **table1**)

SMD2 = AWC2 \* drz2 (from Equation 3)

SMD2 = (0.34-0.33) \* 22.5cm = 0.2cm or 2.0mm (calculated in 5th column of **table1**)

Thus, SMDtotal = SMD1 + SMD2 (from Equation 6)

= 1.298cm or 12.98mm (as shown in the last column of **table1**)

Thus, we can say that the irrigation needs to be applied when the soil moisture depleted by 4.05cm in the root zone depth which we have considered, say 45cm(in our case as only two sensors are installed at two different depths). The same 4.05cm depth of water needs to be applied in the root zone depth to bring the soil profile to field capacity. An example is shown in **table 1**. In the example provided, we have considered the root zone in two layers of 22.5cm each, the two layers soil water content is shown by volumetric moisture content in percentage for P1 and P2 respectively. As can be observed from the table 1, that the soil moisture depletion is more from the top layer than the second profile, and the total soil moisture depletion from the two layers for a particular day is calculated in the last column. It can be seen that the soil moisture depletion increases with the increase in day unless there occurs some precipitation during the growing season. The date for next irrigation did not reach in our case as the moisture depletion was below our allowable depletion level for the subsequent 30 days we have considered.

Another approach

**Not applicable**

**Moisture deficiency, MD:**

MDi % = M.Cfc - M.Ci, %; for ith day ……...Equation 7

Depth of water to be added due to moisture deficiency = MD% \* ρ \* drz (in cm) ……...Equation 8

ρ is the bulk density of the soil profiles in g/cc.

ρ1,2 is the bulk density of the 1st and 2nd layer of the soil respectively.

Here, the bulk density is considered to be same for both the profiles.

The calculations of moisture deficiency in percent and the depth of water to be added due to moisture deficiency is done in table 2 for 1st and 2nd layers represented by P1 and P2 respectively. As from the **table 2**, the days marked by red colour denote that the allowable depletion level is reached and that the same amount of water should be applied to bring the moisture content of the plot/field represented by the node to field capacity.

In both the examples it is assumed that a node represents a particular plot or field, and if **n** number of nodes are deployed to a particular plot/field then the data obtained from each node’s sensors for certain depths will not vary much from the other nodes data, and so, the soil moisture depletion in each nodes will remain more or less the same and hence the irrigation date will also remain the same.

**Other terminologies and formulae associated with the irrigation scheduling based on soil moisture condition:**

Available water holding capacity = (M.Cfc - M.Cpwp )/100 \* ρbulk \* drz); ρ in g/cc ……...Equation 9

For different soil profiles (0-15)cm: (M.Cfc - M.Cpwp )/100 \* ρ1 \* 15

(15-30)cm: (M.Cfc - M.Cpwp )/100 \* ρ2 \* 15

And so on till, n cm: (M.Cfc - M.Cpwp )/100 \* ρn \* 15

Moisture content per metre depth of soil = MC% \* ρ ……...Equation 10

The percentage depletion of available soil water in the effective root zone was estimated by the following equation (Martin et al., 1990):

Maximum Allowable  …...Equation 11

where, *n* is the number of layers in the effective rooting depth used for the soil moisture sampling, *FCi* is the soil moisture at field capacity in the ith layer, *θi* is the soil moisture in ith layer before irrigation and *PWP* is the soil moisture at permanent wilting point. The amount of water applied after the attainment of predefined MAD was calculated as:

 …...Equation 12

where, *Vd* is the volume of irrigation water, *drz* is the effective rooting depth and *A* is the surface area of the plot.

SMD for day i: SMDi = SMDi-1 + ETci + DPi – Ii – Pe,I + GWi …...Equation 13

Where, SMDi is the total soil moisture depletion in the root zone and is defined as difference between total soil moisture stored in the root zone at the field capacity and the current moisture status, ETc- evapotranspiration of crop, DP is the deep percolation, I is the net irrigation amount, Pe is the effective precipitation/rainfall, GW is the groundwater contribution or capillary rise, and ***i*** is the time index.

The initial soil moisture depletion at the beginning of the water balance can be determined as:

SMDi-1 = (θfc –θi-1) \* drz …...Equation 14

Initially on day1, if soil moisture is at field capacity, then SMD will be zero (as from above equation 14).

Readily available water, RAW = TAW \* AD …...Equation 15

Allowable depletion, AD = TAW \* MAD …...Equation 16

*Required irrigation depth = Soil moisture depletion*

Considering the fact that **n** number of multiple nodes having **n** number of sensors(4 sensors in our case) placed at **n** numberof soil layersmay be deployed in a field covering large area having different soil types, the following are the decision taking or triggering action formulae.

**Formulae applied for decision considering n number of nodes:**

**Soil moisture depletion, SMD approach**

Total available water,

TAW = (M.Cfc - M.Cpwp )/100 \* drz……………….Equation 1

Allowable depletion,

AD = TAW \* MAD………….……………………Equation 2

Available water content,

AWC = (M.Cfc - M.Cpwp )/100 ………………...…Equation 3

Where MAD = management allowable depletion, say, 50%

Table: Node1 observation data for day1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Day | Layers | depths(cm) | M.C.fc | M.C.pwp |
| 1 | 1 | d1 | M.C.fc 1 | M.C.pwp 1 |
| 2 | d2 | M.C.fc 2 | M.C.pwp 2 |
| 3 | d3 | M.C.fc 3 | M.C.pwp 3 |
|  |  |  |  |
|  |  |  |  |
| n | dn | M.C.fc n | M.C.pwp n |

For 1st node: TAW1 = (AWC1 \* d1) + (AWC2 \* d2) +…….+ (AWCn \* dn) …………...Equation 4

Similarly, for **n**th node: TAWn = (AWC1 \* d1) + (AWC2 \* d2) +…+ (AWCn \* dn) …...Equation 5

Thus, TAWaverage for the whole field = (TAW1 + TAW2 +...+TAWn)/n …...................Equation 6

For node1: AD1= TAW1 \* MAD

Similarly, For node2: AD2= TAW2 \* MAD

For node **n**: ADn= TAWn \* MAD

Thus, ADavg.= TAWavg.\* MAD

Allowable depletion, ADavg. = TAWavg. \* MAD (applying Equations 2 and 6)……….Equation 7

Soil moisture depletion, SMD = (M.C.fc- M.C.present)/100 \* drz ………..Equation 8

**For 1st node**: SMDfor the **n**th profile = SMD1 + SMD2 + SMD3 +… + SMDn……..Equation 9

SMD1,2,3…,n  represents soil moisture depletion from layers 1,2,3…n respectively.

Now, for 1st node: SMD = SMD1

Similarly, for nth node: SMD = SMDn

Thus, SMDavg. for all the nodes = (SMD1 + SMD2 +……+ SMDn)/n……..Equation 10

Thus, we can say that the irrigation needs to be applied when the soil moisture depleted by the amount of ADavg. calculated from the above equation 7 in the root zone depths. The same amount of water needs to be applied in the root zone depth to bring the soil profiles to field capacity. It generally occurs that the soil moisture depletion increases with the increase in day unless there occurs some precipitation during the growing season. The date for next irrigation will be scheduled as the moisture depletion, SMDavg. will reach the allowable depletion, ADavg. level(calculated) considering the whole field.

OR,

The individual SMDn will be compared to ADavg. separately and then triggering action will be performed accordingly node-wise whenever the SMDn will reach ADavg.(calculated for the whole field) or above. The SMDavg. (equation 10) will also be compared with the ADavg. for the decision of irrigation scheduling.

Table 1:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Days | P1 | P2 | SMD,mm for P1 | SMD,mm for P2 | Total SMD, mm |
| 1 | 29.12 | 33.11 | 10.98 | 2.00 | 12.98 |
| 2 | 24.08 | 32.28 | 22.32 | 3.87 | 26.19 |
| 3 | 23.43 | 32.05 | 23.78 | 4.39 | 28.17 |
| 4 | 23.1 | 31.97 | 24.53 | 4.57 | 29.09 |
| 5 | 22.48 | 31.89 | 25.92 | 4.75 | 30.67 |
| 6 | 26.17 | 32.55 | 17.62 | 3.26 | 20.88 |
| 7 | 25.14 | 32.43 | 19.94 | 3.53 | 23.47 |
| 8 | 24.29 | 32.27 | 21.86 | 3.89 | 25.75 |
| 9 | 23.84 | 32.20 | 22.87 | 4.04 | 26.91 |
| 10 | 23.37 | 32.18 | 23.92 | 4.09 | 28.01 |
| 11 | 22.99 | 32.10 | 24.78 | 4.28 | 29.06 |
| 12 | 23.01 | 32.01 | 24.73 | 4.48 | 29.21 |
| 13 | 23.04 | 32.02 | 24.65 | 4.44 | 29.09 |
| 14 | 22.76 | 31.93 | 25.29 | 4.66 | 29.95 |
| 15 | 22.62 | 31.89 | 25.59 | 4.74 | 30.34 |
| 16 | 23.7 | 32.33 | 23.18 | 3.77 | 26.94 |
| 17 | 23.49 | 32.49 | 23.65 | 3.40 | 27.06 |
| 18 | 23.34 | 32.35 | 23.98 | 3.72 | 27.69 |
| 19 | 25.01 | 32.76 | 20.23 | 2.79 | 23.01 |
| 20 | 28.38 | 33.45 | 12.65 | 1.24 | 13.89 |
| 21 | 28.18 | 33.28 | 13.11 | 1.62 | 14.73 |
| 22 | 28.72 | 33.61 | 11.89 | 0.87 | 12.76 |
| 23 | 27.35 | 33.44 | 14.96 | 1.25 | 16.21 |
| 24 | 24.09 | 32.89 | 22.29 | 2.50 | 24.79 |
| 25 | 23.7 | 32.59 | 23.18 | 3.17 | 26.35 |
| 26 | 22.79 | 32.21 | 25.22 | 4.03 | 29.25 |
| 27 | 24.52 | 32.28 | 21.33 | 3.87 | 25.20 |
| 28 | 25.55 | 32.63 | 19.01 | 3.08 | 22.09 |
| 29 | 24.64 | 32.64 | 21.05 | 3.07 | 24.12 |
| 30 | 23.03 | 32.11 | 24.69 | 4.25 | 28.93 |

Table 2:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Days | P1 | P2 | Moisture deficiency,% for P1 | Moisture deficiency,% for P2 | Depth of water to be added, cm | | |
|  |  |  |  |  | In 1st profile | In 2nd profile | For both profile |
| 1 | 29.12 | 33.11 | 4.88 | 0.89 | 1.65 | 0.30 | 1.95 |
| 2 | 24.08 | 32.28 | 9.92 | 1.72 | 3.35 | 0.58 | 3.93 |
| 3 | 23.43 | 32.05 | 10.57 | 1.95 | 3.57 | 0.66 | 4.23 |
| 4 | 23.1 | 31.97 | 10.90 | 2.03 | 3.68 | 0.69 | 4.36 |
| 5 | 22.48 | 31.89 | 11.52 | 2.11 | 3.89 | 0.71 | 4.60 |
| 6 | 26.17 | 32.55 | 7.83 | 1.45 | 2.64 | 0.49 | 3.13 |
| 7 | 25.14 | 32.43 | 8.86 | 1.57 | 2.99 | 0.53 | 3.52 |
| 8 | 24.29 | 32.27 | 9.71 | 1.73 | 3.28 | 0.58 | 3.86 |
| 9 | 23.84 | 32.20 | 10.16 | 1.80 | 3.43 | 0.61 | 4.04 |
| 10 | 23.37 | 32.18 | 10.63 | 1.82 | 3.59 | 0.61 | 4.20 |
| 11 | 22.99 | 32.10 | 11.01 | 1.90 | 3.72 | 0.64 | 4.36 |
| 12 | 23.01 | 32.01 | 10.99 | 1.99 | 3.71 | 0.67 | 4.38 |
| 13 | 23.04 | 32.02 | 10.96 | 1.98 | 3.70 | 0.67 | 4.36 |
| 14 | 22.76 | 31.93 | 11.24 | 2.07 | 3.79 | 0.70 | 4.49 |
| 15 | 22.62 | 31.89 | 11.38 | 2.11 | 3.84 | 0.71 | 4.55 |
| 16 | 23.7 | 32.33 | 10.30 | 1.67 | 3.48 | 0.57 | 4.04 |
| 17 | 23.49 | 32.49 | 10.51 | 1.51 | 3.55 | 0.51 | 4.06 |
| 18 | 23.34 | 32.35 | 10.66 | 1.65 | 3.60 | 0.56 | 4.15 |
| 19 | 25.01 | 32.76 | 8.99 | 1.24 | 3.03 | 0.42 | 3.45 |
| 20 | 28.38 | 33.45 | 5.62 | 0.55 | 1.90 | 0.19 | 2.08 |
| 21 | 28.18 | 33.28 | 5.83 | 0.72 | 1.97 | 0.24 | 2.21 |
| 22 | 28.72 | 33.61 | 5.28 | 0.39 | 1.78 | 0.13 | 1.91 |
| 23 | 27.35 | 33.44 | 6.65 | 0.56 | 2.24 | 0.19 | 2.43 |
| 24 | 24.09 | 32.89 | 9.91 | 1.11 | 3.34 | 0.38 | 3.72 |
| 25 | 23.7 | 32.59 | 10.30 | 1.41 | 3.48 | 0.48 | 3.95 |
| 26 | 22.79 | 32.21 | 11.21 | 1.79 | 3.78 | 0.60 | 4.39 |
| 27 | 24.52 | 32.28 | 9.48 | 1.72 | 3.20 | 0.58 | 3.78 |
| 28 | 25.55 | 32.63 | 8.45 | 1.37 | 2.85 | 0.46 | 3.31 |
| 29 | 24.64 | 32.64 | 9.36 | 1.36 | 3.16 | 0.46 | 3.62 |
| 30 | 23.03 | 32.11 | 10.97 | 1.89 | 3.70 | 0.64 | 4.34 |

Table 1.a

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Days** | **N1\_P1** | **N1\_P2** | **SMD,mm** | **SMD,mm** | **SMD(sum),mm** | **TAW,P1,mm** | **TAW,P2,mm** | **TAW1(sum)** | **N2\_P1** | **N2\_P2** | **SMD,mm** | **SMD,mm** | **SMD(sum),mm** | **N3\_P1** | **N3\_P2** | **SMD,mm** | **SMD,mm** | **SMD(sum),mm** | **N4\_P1** | **N4\_P2** | **SMD,mm** | **SMD,mm** | **SMD(sum),mm** | **TAW(average)** | **AD(average)** | **SMD(average)** |
| 1 | 29.12 | 33.11 | 10.98 | 2.00 | 12.98 | 40.50 | 40.50 | 81.00 | 31.65 | 33.31 | 5.30 | 1.56 | 6.85 | 33.49 | 34.86 | 1.15 | -1.93 | -0.78 | 31.38 | 33.57 | 5.90 | 0.97 | 6.86 | 81.00 | 40.50 | 6.48 |
| 2 | 24.08 | 32.28 | 22.32 | 3.87 | 26.19 | 40.50 | 40.50 | 81.00 | 31.43 | 33.08 | 5.78 | 2.06 | 7.84 | 33.10 | 33.95 | 2.02 | 0.12 | 2.14 | 29.28 | 33.30 | 10.61 | 1.57 | 12.18 | 81.00 | 40.50 | 12.09 |
| 3 | 23.43 | 32.05 | 23.78 | 4.39 | 28.17 | 40.50 | 40.50 | 81.00 | 31.60 | 33.29 | 5.41 | 1.60 | 7.01 | 32.58 | 32.68 | 3.20 | 2.96 | 6.17 | 28.43 | 32.76 | 12.53 | 2.79 | 15.32 | 81.00 | 40.50 | 14.17 |
| 4 | 23.10 | 31.97 | 24.53 | 4.57 | 29.09 | 40.50 | 40.50 | 81.00 | 31.62 | 33.43 | 5.36 | 1.28 | 6.64 | 32.55 | 32.76 | 3.26 | 2.79 | 6.05 | 28.50 | 32.79 | 12.37 | 2.72 | 15.10 | 81.00 | 40.50 | 14.22 |
| 5 | 22.48 | 31.89 | 25.92 | 4.75 | 30.67 | 40.50 | 40.50 | 81.00 | 30.94 | 33.28 | 6.89 | 1.62 | 8.50 | 31.97 | 33.00 | 4.57 | 2.25 | 6.82 | 28.00 | 32.53 | 13.50 | 3.31 | 16.81 | 81.00 | 40.50 | 15.70 |
| 6 | 26.17 | 32.55 | 17.62 | 3.26 | 20.88 | 40.50 | 40.50 | 81.00 | 33.00 | 35.14 | 2.25 | -2.57 | -0.32 | 33.31 | 34.53 | 1.55 | -1.19 | 0.36 | 31.74 | 33.88 | 5.09 | 0.27 | 5.36 | 81.00 | 40.50 | 6.57 |
| 7 | 25.14 | 32.43 | 19.94 | 3.53 | 23.47 | 40.50 | 40.50 | 81.00 | 32.74 | 35.00 | 2.84 | -2.25 | 0.58 | 33.50 | 33.53 | 1.13 | 1.06 | 2.18 | 30.85 | 33.80 | 7.09 | 0.45 | 7.54 | 81.00 | 40.50 | 8.44 |
| 8 | 24.29 | 32.27 | 21.86 | 3.89 | 25.75 | 40.50 | 40.50 | 81.00 | 32.67 | 34.68 | 3.00 | -1.53 | 1.47 | 33.18 | 33.12 | 1.84 | 1.97 | 3.81 | 30.04 | 33.68 | 8.90 | 0.72 | 9.62 | 81.00 | 40.50 | 10.16 |
| 9 | 23.84 | 32.20 | 22.87 | 4.04 | 26.91 | 40.50 | 40.50 | 81.00 | 32.70 | 34.44 | 2.92 | -0.99 | 1.94 | 32.93 | 32.72 | 2.41 | 2.89 | 5.29 | 29.12 | 33.06 | 10.99 | 2.11 | 13.10 | 81.00 | 40.50 | 11.81 |
| 10 | 23.37 | 32.18 | 23.92 | 4.09 | 28.01 | 40.50 | 40.50 | 81.00 | 32.43 | 34.42 | 3.53 | -0.94 | 2.58 | 32.79 | 33.68 | 2.72 | 0.72 | 3.44 | 29.17 | 32.79 | 10.86 | 2.73 | 13.58 | 81.00 | 40.50 | 11.91 |
| 11 | 22.99 | 32.10 | 24.78 | 4.28 | 29.06 | 40.50 | 40.50 | 81.00 | 32.21 | 34.23 | 4.03 | -0.52 | 3.52 | 32.48 | 33.28 | 3.42 | 1.62 | 5.04 | 29.23 | 32.65 | 10.73 | 3.04 | 13.77 | 81.00 | 40.50 | 12.85 |
| 12 | 23.01 | 32.01 | 24.73 | 4.48 | 29.21 | 40.50 | 40.50 | 81.00 | 32.60 | 34.04 | 3.15 | -0.09 | 3.06 | 32.64 | 34.53 | 3.07 | -1.19 | 1.88 | 30.16 | 32.90 | 8.65 | 2.48 | 11.13 | 81.00 | 40.50 | 11.32 |
| 13 | 23.04 | 32.02 | 24.65 | 4.44 | 29.09 | 40.50 | 40.50 | 81.00 | 31.94 | 34.09 | 4.63 | -0.20 | 4.43 | 32.52 | 34.13 | 3.32 | -0.30 | 3.02 | 30.00 | 32.51 | 9.00 | 3.36 | 12.36 | 81.00 | 40.50 | 12.23 |
| 14 | 22.76 | 31.93 | 25.29 | 4.66 | 29.95 | 40.50 | 40.50 | 81.00 | 31.75 | 34.16 | 5.06 | -0.37 | 4.69 | 32.50 | 34.28 | 3.38 | -0.64 | 2.74 | 30.01 | 32.35 | 8.98 | 3.70 | 12.68 | 81.00 | 40.50 | 12.51 |
| 15 | 22.62 | 31.89 | 25.59 | 4.74 | 30.34 | 40.50 | 40.50 | 81.00 | 31.43 | 34.15 | 5.78 | -0.33 | 5.45 | 32.49 | 33.89 | 3.41 | 0.24 | 3.65 | 30.00 | 32.36 | 9.00 | 3.70 | 12.70 | 81.00 | 40.50 | 13.03 |
| 16 | 23.70 | 32.33 | 23.18 | 3.77 | 26.94 | 40.50 | 40.50 | 81.00 | 32.10 | 34.69 | 4.28 | -1.54 | 2.73 | 33.11 | 34.98 | 2.00 | -2.20 | -0.20 | 32.70 | 33.01 | 2.94 | 2.24 | 5.17 | 81.00 | 40.50 | 8.66 |
| 17 | 23.49 | 32.49 | 23.65 | 3.40 | 27.06 | 40.50 | 40.50 | 81.00 | 32.73 | 34.72 | 2.87 | -1.62 | 1.25 | 33.00 | 35.80 | 2.26 | -4.04 | -1.78 | 32.74 | 33.18 | 2.84 | 1.84 | 4.68 | 81.00 | 40.50 | 7.80 |
| 18 | 23.34 | 32.35 | 23.98 | 3.72 | 27.69 | 40.50 | 40.50 | 81.00 | 32.74 | 34.53 | 2.83 | -1.20 | 1.63 | 33.10 | 35.61 | 2.02 | -3.63 | -1.61 | 32.57 | 33.58 | 3.22 | 0.94 | 4.16 | 81.00 | 40.50 | 7.97 |
| 19 | 25.01 | 32.76 | 20.23 | 2.79 | 23.01 | 40.50 | 40.50 | 81.00 | 33.17 | 34.96 | 1.87 | -2.15 | -0.28 | 33.58 | 35.10 | 0.94 | -2.48 | -1.54 | 32.71 | 33.73 | 2.90 | 0.61 | 3.51 | 81.00 | 40.50 | 6.18 |
| 20 | 28.38 | 33.45 | 12.65 | 1.24 | 13.89 | 40.50 | 40.50 | 81.00 | 33.36 | 35.46 | 1.45 | -3.29 | -1.84 | 33.85 | 35.00 | 0.33 | -2.25 | -1.92 | 32.65 | 33.60 | 3.03 | 0.91 | 3.94 | 81.00 | 40.50 | 3.52 |
| 21 | 28.18 | 33.28 | 13.11 | 1.62 | 14.73 | 40.50 | 40.50 | 81.00 | 33.25 | 35.09 | 1.69 | -2.45 | -0.76 | 33.79 | 34.77 | 0.48 | -1.73 | -1.25 | 32.47 | 33.54 | 3.45 | 1.03 | 4.47 | 81.00 | 40.50 | 4.30 |
| 22 | 28.72 | 33.61 | 11.89 | 0.87 | 12.76 | 40.50 | 40.50 | 81.00 | 33.24 | 35.56 | 1.71 | -3.52 | -1.81 | 33.81 | 34.38 | 0.42 | -0.86 | -0.44 | 31.55 | 33.42 | 5.50 | 1.30 | 6.80 | 81.00 | 40.50 | 4.33 |
| 23 | 27.35 | 33.44 | 14.96 | 1.25 | 16.21 | 40.50 | 40.50 | 81.00 | 33.09 | 35.16 | 2.05 | -2.60 | -0.55 | 33.09 | 33.95 | 2.05 | 0.11 | 2.16 | 30.65 | 33.36 | 7.54 | 1.43 | 8.97 | 81.00 | 40.50 | 6.70 |
| 24 | 24.09 | 32.89 | 22.29 | 2.50 | 24.79 | 40.50 | 40.50 | 81.00 | 33.00 | 34.82 | 2.25 | -1.84 | 0.41 | 33.05 | 34.00 | 2.14 | 0.00 | 2.14 | 29.72 | 32.85 | 9.63 | 2.59 | 12.22 | 81.00 | 40.50 | 9.89 |
| 25 | 23.70 | 32.59 | 23.18 | 3.17 | 26.35 | 40.50 | 40.50 | 81.00 | 32.90 | 34.28 | 2.48 | -0.63 | 1.85 | 32.75 | 33.59 | 2.81 | 0.92 | 3.73 | 29.50 | 32.80 | 10.13 | 2.70 | 12.83 | 81.00 | 40.50 | 11.19 |
| 26 | 22.79 | 32.21 | 25.22 | 4.03 | 29.25 | 40.50 | 40.50 | 81.00 | 33.66 | 34.81 | 0.76 | -1.82 | -1.06 | 32.89 | 33.00 | 2.50 | 2.25 | 4.75 | 29.42 | 32.65 | 10.31 | 3.04 | 13.34 | 81.00 | 40.50 | 11.57 |
| 27 | 24.52 | 32.28 | 21.33 | 3.87 | 25.20 | 40.50 | 40.50 | 81.00 | 33.86 | 34.83 | 0.32 | -1.87 | -1.55 | 33.63 | 33.95 | 0.84 | 0.11 | 0.95 | 32.30 | 33.43 | 3.83 | 1.28 | 5.11 | 81.00 | 40.50 | 7.43 |
| 28 | 25.55 | 32.63 | 19.01 | 3.08 | 22.09 | 40.50 | 40.50 | 81.00 | 33.88 | 34.64 | 0.27 | -1.44 | -1.17 | 33.29 | 33.50 | 1.60 | 1.13 | 2.74 | 32.76 | 34.19 | 2.79 | -0.43 | 2.36 | 81.00 | 40.50 | 6.51 |
| 29 | 24.64 | 32.64 | 21.05 | 3.07 | 24.12 | 40.50 | 40.50 | 81.00 | 33.84 | 34.58 | 0.36 | -1.31 | -0.95 | 32.76 | 33.20 | 2.78 | 1.80 | 4.58 | 32.86 | 33.73 | 2.57 | 0.61 | 3.17 | 81.00 | 40.50 | 7.73 |
| 30 | 23.03 | 32.11 | 24.69 | 4.25 | 28.93 | 40.50 | 40.50 | 81.00 | 33.80 | 34.51 | 0.45 | -1.15 | -0.70 | 32.62 | 32.83 | 3.10 | 2.63 | 5.73 | 32.64 | 33.47 | 3.06 | 1.19 | 4.25 | 81.00 | 40.50 | 9.56 |