# Lab 1

Tasks 1 and 2

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Farm name** | **Moisture Decay rate** | **ydecay\_rate** | **Yield1** | **Yield2** | **Yield3** | **Yield4** | **Yield5** | **Maximum Observed Yield** | **Minimum Observed Yield** | **Average Observed Yield** |
| Farm 1 | 0.005 | 0.09 | 0.02% | 0.06% | 0.02% | 0.02% | 0.01% | 0.06% | 0.01% | 0.03% |
| Farm 2 | 0.07 | 0.05 | 44.01% | 14.99% | 59.87% | 14.24% | 54.04% | 59.87% | 14.24% | 37.43% |
| Farm 3 | 0.05 | 0.07 | 12.19% | 4.10% | 55.96% | 4.75% | 36.20% | 55.96% | 4.10% | 22.64% |
| Farm 4 | 0.02 | 0.1 | 0.01% | 0.11% | 0.20% | 0.01% | 5.82% | 5.82% | 0.01% | 1.23% |

From the simulation, it is obvious to us that this system is not efficient at all. Even with the total water at 2.0, the artificial irrigation method applied in this question, the ‘warabandi’ system, results in the water being depleted very early in the 6-week period, just after 44 days. This is problematic for multiple reasons.

During our simulations, we noticed that this system is not very efficient. Due to the fixed number of days between the supply of water, the farmer cannot efficiently choose the timing and so he has to water his crops whenever it’s his turn. Sometimes, this results in the moisture level increasing above the maximum level which damages the crop.

Otherwise, when the water has been depleted, the moisture of the soil becomes entirely dependent on rainfall. So, for every time we run the simulation, the results are different as the rain is random, but on average, we can see that the yield is very low. The reason for this is that when the rain is not there, the moisture level of the soil drops below the minimum level and the high ‘ydecay\_rate’ results in the yield falling drastically.

From these simulations, we can draw some conclusions. First and foremost, as stated above, this system is not good as it ignores the rain forecast and current moisture level of the soil. Secondly, over-irrigating plants and under-irrigating them happens in the 6 weeks, resulting in drastic effects on the crops. Lastly, as a suggestion, we can say that the types of crops being grown are not suitable for this style of irrigation and a change in their type could result in a better yield.