# Appraising Land with Field Tile Drainage

By Herbert Meyer, A.R.A

## Abstract

This article is about the value discounts that can be identified and extracted from market sales of prime farmland due to poor field drainage. The appraiser has used imperfect matched pairings to extract price adjustments on a per deeded acre, per tilled acre, and on a per productivity unit basis, based on crop yields, for the more extreme cases of wet tilled fields in West Central Illinois.

This article examines the price discounts attributable to inadequate drainage that can be identified by comparing market sales of prime farmland. As an appraiser, I have been asked quite frequently about the contributory value of all the tile line that farmland owners have installed on their land. My explanation to owners is that the market tends to assume proper drainage, and has provided a means of discounting land values when seriously inadequate drainage is apparent. The land market does not adjust value for the contribution that the tile makes for being present.

There is no means to inspect the condition of tile lines on farmland. The tile line maps are seldom available for subject farms, and the tile line maps are almost never available for the comparable farm sales. Therefore, the question turns to those comparable sales with apparent wet fields by observing the surface evidence. The appraiser can consider the availability of surface evidence as to the locations of field drainage tiles, waterways, and ditches. Typical surface evidence of tile lines is the terrace tile inlets and the tile outlets.

This study looks at a few sales of individual farms that were not properly tiled to achieve surface and subsurface drainage. None of these farms lie within the vast drainage districts where multiple farms are drained through a common organized trunk system. These are only five examples of cropland in central Illinois where land was not appropriately drained. The sales prices demonstrate very significant discounts. These farms typically have soil types with very high productivity ratings. Most of these five examples include an added variable of needing a trunk line across land of an adjoining owner. Other variables that are not as apparent include the crop production and yield histories. These wet farms likely have had reduced yields due to being wet and can also have excessive compaction due to the operators working the fields during wet conditions in the spring and fall of the year.

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The sales comparisons used in this article are not the only land with wet areas that have sold. Adjoining owners will sometimes buy land that they know needs additional tile drainage for prices that do not reflect such strong price discounts.

To analyze the differences from field drainage in this study, I have used three comparison units: the per deeded acre , per tilled acre, and a productivity point per tilled acre unit.

The productivity index was established through cooperation between the University of Illinois Cooperative Extension Service and the USDA-SCS (now the Nature Resources Conservation Service) and is published in University of Illinois Circular 1156. The index was based upon a formula using yields from four crops: corn, beans, wheat, and oats. The weight given to the production of each crop is based upon the historic percentage of production of each crop on each soil type. This 1978 publication established a 160-point index, which it states would have been very similar to the 10-year average corn yields on the prime soils prior to that time. The idea behind the index is that the comparable relationship should be maintained over time, assuming that new technologies influence all the soils' abilities to produce in a relative manner.

(Circular 1156 was updated and replaced in 2000 by Bulletin 811, Optimum Crop Productivity Ratings for Illinois Soils and Bulletin 810, Average Crop, Pasture and Forestry Productivity Ratings for Illinois Soils.)

## First Comparison

The first sale comparison was a small tract of land in Peoria County. This 40-acre tract was bought by a farmer involved in a sale of land to a local school district. Thus, a capital gains tax basis trade extra motivated the buyer in this sale. The seller held a private auction with the known interested buyers invited to the kitchen table auction. The property was about one quarter mile from two potential tile outlet locations on adjoining landowners. The sales price of this tract was compared to one that was sold at sealed bid sale with no right of raise the bids (Sale 2), and a second direct negotiated sale (Sale 3).

The 40-acre tract sold for $3,530 per deeded acre. This property had thirty-eight tilled acres with a productivity index rating of 159 per tillable acre. This sale price averaged $3,716 per tilled acre and $23.40 per productivity point.

The comparable sealed bid sale (Sale 2) sold for $4,096 per deeded acre. The 79 tilled acres with a productivity index rating of 153 per tillable acre averaged $4,148 per tillable acre and $26.69 per productivity point. This sale indicated a discount of $566 per deeded acre or $3.29 per productivity point for the wetness. The price per tilled acre is $432 higher than the first sale. As the appraiser, I adjusted the per acre value from the comparable sale to have similar productivity as the poorly drained tract by multiplying the per tilled acre productivity of the wet tract by the price per productivity point of the comparable sale. The six point higher productivity rating of the wet tract results in the adjusted value of $528 for the tilled acres. This is $96 bigger difference in value than the direct comparison of the price for tilled acres.

The third tract sale sold directly for $3,178 per acre with a productivity index rating of 125 and a $27.10 price per total productivity point. This sale with a lower productivity index rating would first indicate a reverse discount of -$352 per deeded acre. However, there is a $3.70 per productivity point difference that is attributable to the wet condition. The price per tilled acre is $49 lower than the first sale. As the appraiser, I adjusted the per acre value indications from the comparable third sale to have similar productivity as the poorly drained sale again by multiplying the per tilled acre productivity of the wet tract by the price per productivity point of the comparable sale. The 34 point higher productivity rating of the wet tract results in the adjusted value of the tilled acres being $593. This is $642 greater difference in value than the direct comparison of the price for tilled acres.

| Sale | Total Ac, | Price/Ac. | Tillable | PI/Till. | $/Till Ac. | $/PI Point | Per TA | PI |
|---|---|---|---|---|---|---|---|---|
| 1 | 40 | 3530 | 38 | 159 | 3716 | 23.4 | Value | Difference |
| 2 | 80 | 4096 | 79 | 153 | 4148 | 26.69 | Sale 1 | Drainage |
| 3 | 45 | 3178 | 39 | 125 | 3667 | 27.1 | $/PI adj. | Per TA |
| 1 Vs 2 | | 566 | | | 432 | 3.29 | $4,244 | $528 |
| 1 Vs 3 | | -352 | | | -49 | 3.7 | $4,309 | $593 |

## Second Comparison

The second comparison uses sale numbers four and five, which are direct sales of two tracts to related buyers. The prices were established by direct negotiations between the sellers and buyers. If new tile lines were installed on the wetter tract, they could use an outlet as close as a few hundred feet from the property. However, a more appropriate outlet would be about one half mile off the property.

The wet 94-acre tract (number four) sold for $3,300 per deeded acre. This tract has ninety-two tilled acres with a productivity index rating of 159 per tillable acre, which is $21.22 per productivity point for the tilled acres. The drained 80-acre tract (number five) sold for $3,600 per deeded. This sale had seventy-eight tilled acres with a productivity index rating of 156 per tillable acre, which was $23.63 price per productivity point. The deeded acre prices on this pair of sales indicate a discount of $300 per acre for wetness. The tilled acre price difference is $320 and the productivity point difference is $2.41 for the wetness. The productivity-adjusted difference indicated by these sales was $385 per tilled acre.

| Sale | Total Ac, | Price/Ac. | Tillable Ac | PI/Till. Ac. | $/Till Ac. | $/PI Point | Per TA Value | PI adjusted Difference |
|---|---|---|---|---|---|---|---|---|
| 4 | 94 | 3300 | 92 | 159 | 3372 | 21.22 | Sale 4 | Drainage |
| 5 | 80 | 3600 | 78 | 156 | 3692 | 23.63 | $/PI adj. | Per TA |
| 4 Vs 5 | | 300 | | | 321 | 2.41 | $3,757 | $385 |

## Third Comparison

The third comparison was four tracts of an auction in Knox County in February 2001 that are numbered as sales six though nine. One of the four tracts was wet but it had superior location near Galesburg with some minor potential for long term future urban growth. One of the three comparable tracts was improved with functionally dated grain bins and a cattle shed. This property had two minimally adequate locations where tile line outlets could be placed. The better alternative was to run two trunk lines past the property boundary to about one half mile off the property.

Sale number six was the wet 88.31 acre tract which sold for $2,675 per deeded acre. This sale had eighty-three tilled acres with a productivity index rating of 149 per tillable acre. This gives the property a tilled acre price of $2,846 or $19.01 price per productivity point. The three dryer tracts totaled 225.25 acres and averaged $3,283 per deeded acre. A total of 208 tilled acres had an average productivity index rating of 153 per tillable acre. These three comparable sales had a value indication of $3,557 per tilled acre and an average $23.20 price per productivity point. This comparison of sales indicated a discount of $608 per deeded acre and $4.19 per productivity point for the wetness. The tilled acre difference was $710 prior to a productivity adjustment. The four point lower productivity on the wet tract resulted in an adjusted tilled acre difference of $612 per acre.

| Sale | Total Ac, | Price/ Ac. | Tillable Ac. | PI/Till. Ac. | $/Till Ac. | $/PI Point | Per TA Value Sale 6 | PI adjusted Difference Drainage |
|---|---|---|---|---|---|---|---|---|
| 6 | 88.31 | 2675 | 83 | 149 | 2846 | 19.01 | $/PI adj. | Per TA |
| 7 | 80 | 3525 | 76 | 157 | 3711 | 23.64 | $3,522 | $676 |
| 8 | 79.2 | 3150 | 71 | 151 | 3518 | 21.94 | $3,269 | $423 |
| 9 | 66.05 | 3150 | 61 | 151 | 3411 | 22.64 | $3,373 | $527 |
| 7, 8, & 9 | 225.25 | 3285 | 208 | 153 | 3557 | 23.21 | $3,458 | $612 |
| 6 Vs Ave. | | 608 | | | 711 | 4.2 | | |
| Range | | 850 | | | 864 | 4.63 | | |

## Fourth Comparison

The fourth comparison of sales was 163 acres of Warren County land auctioned in February 2001 as equal halves of the larger parcel. These two sales were numbers ten and eleven. This tract of land had very gentle slopes to the east end with the wettest land located along the road. The comparable sales were the parts of another auction sale located just north of the wet tracts. The potential locations to empty tile lines from this property were a long half-mile across the adjoining farms.

The wet 163 acres averaged $2,525 per deeded acre. The productivity index rating of the 160 tilled acres was 156 per tillable acre. The tilled acres averaged $2,580 and $16.35 per productivity point. The six dryer comparison tracts were numbers twelve though seventeen, which totaled 412.64 acres averaged $3,061 per deeded acre. These dryer tracts totaled 405 tilled acres with an average productivity index rating of 156 per tillable acre. These sales had a weighted tilled acre price of $3,120 and a weighted average $20.26 price per productivity point. This comparison of sales indicated an average discount of $536 per deeded acre. The difference in the tillable acre

prices between the average of wetter sales ten and eleven and the dryer sales twelve though seventeen was $540 per tilled acre and $3.91 per productivity point for the wetness. The wetter sales had a 5 point higher productivity rating than the weighted average of the dryer sales. Therefore, the productivity adjusted tilled acre value difference was $582, $42 higher than the unadjusted indication.

| Sale | Total Ac, | Price/ Ac. | Tillable Ac. | PI/Till. Ac. | $/Till Ac. | $/PI Point | Per TA Value Sale 6 | PI adjusted Difference Drainage |
|---|---|---|---|---|---|---|---|---|
| 6 | 88.31 | 2675 | 83 | 149 | 2846 | 19.01 | $/PI adj. | Per TA |
| 7 | 80 | 3525 | 76 | 157 | 3711 | 23.64 | $3,522 | $676 |
| 8 | 79.2 | 3150 | 71 | 151 | 3518 | 21.94 | $3,269 | $423 |
| 9 | 66.05 | 3150 | 61 | 151 | 3411 | 22.64 | $3,373 | $527 |
| 7, 8, & 9 | 225.25 | 3285 | 208 | 153 | 3557 | 23.21 | $3,458 | $612 |
| 6 Vs Ave. | | 608 | | | 711 | 4.2 | | |
| Range | | 850 | | | 864 | 4.63 | | |

No size adjustment was made in these sales as there were multiple buyers in this group. These were two sales where the large parcels of land were offered as dis-assembled parts of the total land offered for sale. This is a common practice in Illinois as a means of attracting more buyers through making land available to less affluent potential buyers in the market.

## Fifth Comparison

The fifth comparison was 158 acres in Warren County that did not sell at an attempted auction and subsequently was brokered a few days later in November 2001. This tract was very flat except for a draw along the north side that provided a natural potential drainage tile outlet. There were two bins and a machine shed on this land. The comparable sales tracts were parts of another auction located just south of the wetter tract.

Sale eighteen, the wetter 158 acres, sold for $2,713 per acre. The tilled land part had a deeded acre contribution of $2,606 per deeded acre, a tilled acre contribution of $2,709 per tilled acre on 152 acres with a productivity index rating of 154 and $17.30 per productivity point. The three dryer tracts totaled 317 deeded acres and an average price of $3,035 per deeded acre. This group of dryer tracts had 306 tilled acres with a weighted average productivity index rating of 156 and averaged $20.12 per productivity point. Comparable sales nineteen through twenty-one indicated a discount of $429 per deeded acre. The unadjusted tilled acre difference was $435 and $2.82 per productivity point for the wetness. These comparisons needed adjustment for a two point difference in the productivity rating resulting in an adjusted indicated difference of $389 per tilled acre. The cost to tile this property would not include any trunk line. Therefore, the cost to cure wetness is that of pattern tiling the subject land alone.

| Sale | Total Ac, | Price/ Ac. | Tillable Ac. | PI/Till. Ac. | $/Till Ac. | $/PI Point | Per TA Value Sale 18 | PI adjusted Difference Drainage |
|---|---|---|---|---|---|---|---|---|
| 18 | 158 | 2606 | 152 | 154 | 2709 | $17.30 | $/PI adj. | Per TA |
| 19 | 77 | 3054 | 74 | 158 | 3178 | $20.13 | $3,100 | $391 |
| 20 | 73 | 3243 | 72 | 156 | 3288 | $21.07 | $3,245 | $536 |
| 21 | 167 | 2935 | 160 | 156 | 3063 | $19.68 | $3,031 | $322 |
| 19 - 21 | 317 | 3035 | 306 | 156 | 3144 | $20.12 | $3,098 | $389 |
| Difference | | 429 | | | 435 | $2.82 | | |
| Range | | 637 | | | 578 | $3.77 | | |

These five examples indicate that the discount per productivity index point for wet cropland was between $2.41 and $4.19. The deeded acre prices range widely with the first comparison having one inverse indication, a second low indication of $300, and a high indication of $850 per deeded acre. The adjusted indicated discounts on the tilled acre basis ranged from $322 to $821. As an appraiser, I do not believe it is appropriate to seek out the mode or the average of these indicated discounts due to the different conditions of the wet fields. These ranges can be different, dependent upon the percentage of a property affected by apparent wetness, productivity rating of the subject land, and specific neighborhood demand for land. This discount would be expected to be higher than these sales indicate if tile line drainage should require longer or larger trunk lines to achieve satisfactory results or if the fertility history of the farm is in question.

Therefore, when the farm owners ask, “Did you include a value contribution for the drainage tile I had installed on my farm in your appraisal?” The answer is, “Yes.” The market in general looks at land as being adequately drained and the drainage contribution is included in the value of typical cropland. The more probative question for the appraiser to consider might be, “Did I discount the value appropriately for the wet spots that remain in the fields on this farm?”