



FARM MAPPING — WHO NEEDS IT?

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Several years ago, I started asking people I met, "How do you know where you are? Geographically speaking, that is."

I was surprised at the answers I received. Some people would reference their location to a major landmark, others would reference themselves to a distance and a direction from north, like "we live 10.5 miles northwest of the center of Phillipsburg."

Still others (usually geographers or engineers) would give a set of coordinates such as "I am at 40 and a half degrees north latitude and about 78 degrees west longitude." Still others, when asked how to get to their work, or home or to the store, might say, "it's over there (pointing vaguely with their finger)." Others, say with utter sincerity and if checked by their performance, used the sun as a positioning and direction instrument. That's OK as long as the sun is shining or it is daytime.

Now, I've met a lot of farmers, when asked where the ground was the wettest, or where a patch of weeds were located in his field, could walk me right to the spot, but when asked how they knew where they were standing in the field, could not give a consistent and precise answer — but they knew *exactly* how to get to a certain problem located in the field.

The point is this, in today's emerging agricultural production arena, many different people are interfacing in acquiring data from the field (soil characteristics, nutrient levels, yield from grain combines, topography (elevation), and weed/pest outbreaks). These people may not be the farmer that has driven all the farm machinery over those fields for the last 30 years. In evaluating the field data and making decisions about chemical application, manure application, nutrient application, we have to have a common language that can be used to personally discuss the interpretation of the data and to make management decisions, and also to program or control the farm machinery to apply those crop inputs we discussed.

We need a system of keeping track of where we are and how to get to the next place, so that both humans and machines can communicate with sufficient accuracy that the chemicals and crop inputs get to approximate correct location in the field. There are two considerations: 1) a consistent set of locational guidelines and, 2) an understanding of the accuracy of the specific location we think we are talking about, when we decide to apply some manure or chemical, or — even the seed population. That is why farm mapping is becoming much more important.

There are two kinds of data, spatial data — such as a location point on the surface of the earth (like in the middle of a corn field where a

sink hole is developing), and attribute data (descriptive data) that describes a condition, like "wet, dry, clay, loam, red, green, but — you get the idea." Farm mapping systems can be simple, such as a hand drawn sketch that give the reader an approximate sense of the location and characteristic of some place in a field. Farm mapping systems can be complex, using computers and geographic information systems (GIS) to store digital maps in the GIS database. Each of the digital maps, is characterized by a common set of locational (spatial) characteristics, so that the different digital maps can be referenced to each other.

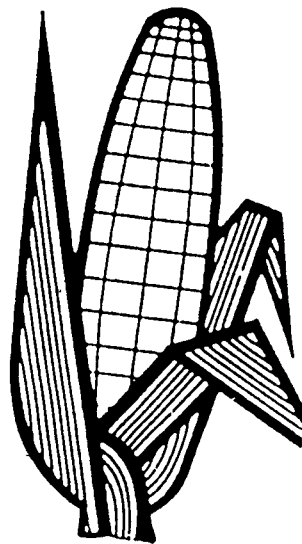
That is the purpose of GIS — to keep track of each location in one specific map can be located on each of the other maps. To visualize this, if you had a stack of transparent maps of the same field, you could lay each map on top of the other, a single

location in a field would form one single point if you were above the map stack and looked down through the digital map layers. That is called "piercing," so we could electronically chose any point in a field, say where there was a weed problem, and electronically, look down through each layer — the soil, nutrients, yield, weed, pest maps, and data at that location in each map layer could give us an insight as to the probable cause of the problem.

Now we could talk about the geographic data and coordinate systems, such as latitude and longitude, and the datums, and geoids that allow us to use a consistent set of distances and coordinates. But if we are going to get into the precision agricul-

ture age, we need to use computers and spatial (locational) data that is universal in its ability to allow any person, or computer, or agricultural machine to understand where the point of interest is located or "where we are."

We need these computer-based farm mapping systems that use GPS-derived locational data and a system of common coordinates so that we can store digital and locational information about the production fields. By using computer-based farm management systems, we can, from year-to-year, always be able to refer to the same place in the field with accuracy. We will talk much more about this in "farm-mapping" technology in future articles.



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