



## Evaluation of GPS & GIS in Nursery Production

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**Nature of Work:** Emerging technology can greatly affect the way nurseries are able to manage crop production and business decision making. Managers frequently have little time to explore new applications that could improve their management. The major objective of this project is to evaluate the use of GPS (Global Positioning System) and GIS (Geographic Information System) and how they might be implemented into standard production practices.

A handheld computer equipped with a GPS unit and GIS software was evaluated. The GPS unit pinpoints your location within three feet and the GIS software, ArcPad 7, records the locations. These locations can be linked together to create maps or to locate specific crops.

Mobile GIS takes the office into the field. A mobile GIS unit enables field-based personnel to capture, store, update, analyze and display geographic information. Mobile GIS can integrate the following technologies: a mobile device, global positioning systems, and wireless communication for internet GIS access.

Mobile GIS can be used to complete the following tasks. It can create field maps that can be accessed and edited while out in the nursery. Inventories can be created and updated at multiple locations. Production practices can be recorded at specific sites. Inspection reports from scouts can be created along with their recommendations and follow up treatments.

A Trimble GeoXH unit was used to develop a nursery field map, capture the crop locations and enter specific data. The GeoXH is a hand held computer running Microsoft Windows Mobile and has a built-in GPS unit. The software, ArcPad 7, is designed for field tasks that require easy-to-use tools running on mobile computers such as Pocket PCs, laptops and tablet PCs. Arc Pad provides mapping, GIS and GPS integration, and improved data collection for field users.

**Results and Discussion:** The Center for Applied Nursery Research was mapped using the GeoXH with the GPS unit and ArcPad software. The outside boundaries were located with the GSP unit and saved. The greenhouses, production beds, shade house, office building and trial garden were all included.

A data base was developed that first identified the crop. Included in the data fields were location on the map, bed or structure ID, crop area size, plant ID, plant spacing, number of plants, container size, plant height and width, projected sale date, and comments. This information was completed upon our first data entry and was not required to be entered again unless changes occurred.

The second data set dealt with crop production. Included in the data for specific sites were a fertilizer product, fertilizer rate, fertilizer frequency, fertilizer application date, pests identified,

pest diagnosis, recommended treatment, pesticide rate, pest treatment date, location, effectiveness, and comments.

Collection of data required identification of the location with the GPS. The GPS located five satellites and placed a location on our map (accuracy to three feet). The data fields are then pulled up and can be completed as desired. Initially a new GPS location had to be identified each time new data was to be entered. Now we should be able to click on an existing location and add new data. The GSP unit was slow to find the necessary satellites particularly when under shade or in the poly houses.

With a large number of fields to be completed, entry of the data was slow using the screen keyboard for letters and numbers. Drop down boxes with the most common entries were developed which greatly speeded up the entry process. The small screen size of the hand-held unit limits the number of fields that are visible at one time. The limited number of characters visible in the data fields results in hiding a portion of the entry. In bright sun the readability of the screen can slow progress. The entry keyboard often obscures the entry data sheets making it nearly impossible to enter the data. The overly sensitive keyboard usually inserted two, three or more of the same character into the data fields. The data can be down loaded to a desktop computer and the entry data reviewed or printed.

These units look like they could be very useful in collection field data for inventory and plant condition. I think the scouting reports and recommendations could provide valuable records. The production aspects seem to be less useful. The unit was slow and difficult to use. Entry of data was a challenge. However, as new technology in hardware and software become available, these limitations should disappear.

**Significance to the Industry:** The use of GIS and GPS will become part of the nursery management tools of the future. The question is “When should you integrate this new technology into your operation?” I think that big changes will streamline and simplify the use of this technology in the next few years as well as reduce costs.