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Utilization of Navigation Systems to Enhance the Efficiency of Field Workers

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ABSTRACT

A field study was carried out by the extension workers to evaluate the importance of navigation system in agriculture. Two set of field workers with and without the navigation system were deployed to dispense the farm literature to pre decided subjects at specific locations. It was recorded that the field workers with a navigator saved on time and expenses while the worker without the navigator took more time and incurred more expenses under given conditions. The working conditions were more cordial when a navigator was handed over to the worker.

Kew Words: Navigation, Agriculture, Time saving, Efficiency of field workers.

INTRODUCTION

Navigation system comprises of an electronic map combined with route instructions, displayed on a screen. The system communicates via global positioning system (GPS) to display on the screen, the users' geographic location and direction of travel. In the system an input in the form of destination is fed using a keypad and then it calculates the shortest route, giving both visual and audible directions to the destination. Different types of navigation systems are used for road, rail and air transportation. These are present in devices like Portable Navigation Devices (PNDs), Automobile Navigation Systems and the most popular and commonly used Smart Mobile Phones. (Abbott and Powell, 1999).The navigation system works as shown in Fig 1.

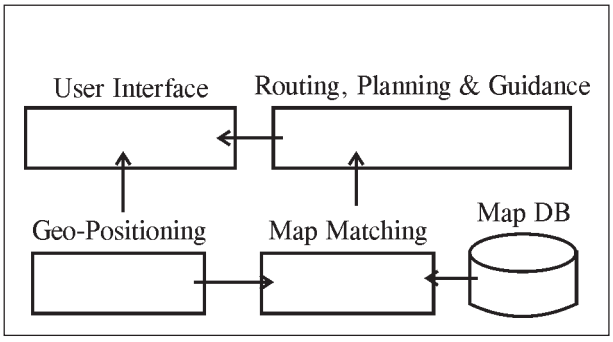

Fig1: Flow diagram of working model of navigation system.

The GPS systems are used extensively in agriculture extension for Mapping soil properties, Chemical application, Chemical prescriptions, Tillage maps, Yield mapping, Pest mapping, Topographic maps and Planting maps(Dana,1997). The system has improved the working efficiency of the extension work. Apart from this the need of navigation has been realized in finding the routes/directions to the various villages. Considering the state Punjab (Table 1), it has 22 districts, 145 blocks and 12813 villages (Anon, 2013).

On an average there are 500 villages per district in Punjab. For field staff to work efficiently and reach the farmers in the remote areas, navigation plays a vital role. Field staff faces great difficulty in reaching the remote areas. Mostly they either ask people on the way or get the directions over the phone calls, by following sign boards or milestones (if present). The whole exercise involves spending extra time in finding the location leaving less time for the productive work. Other than this it involves consumption of extra fuel and increased expenditure over phone calls and diesel. To overcome all these hurdles, navigation seems to be a good alternative. Navigation based upon GPS can be used effectively for reaching the unreached.

The present study was undertaken to compare

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the native system of navigation to the computer based navigation systems, its optimal utilization to enhance the productivity and /or efficiency of field workers and the economic benefit in utilizing the navigation system.

Table 1. District wise division of blocks and villages in Punjab State.

S. No	District	No. of Blocks	No. of Villages
1.	Amritsar	9	736
2.	Barnala	3	125
3.	Bathinda	8	282
4.	Firozepur	6	688
5.	Fatehgarh Sahib	5	446
6.	Fazilka	4	313
7.	Faridkot	2	166
8.	Gurdaspur	11	1208
9.	Hoshiarpur	10	1410
10.	Jalandhar	11	954
11.	Kapurthla	5	691
12.	Ludhiana	12	910
13.	Moga	5	329
14.	Mansa	5	240
15.	Muktsar	4	228
16.	Mohali	4	408
17.	Pathankot	5	659
18.	Patiala	8	914
19.	Sangrur	10	565
20.	Rupnagar	5	598
21.	Taran Taran	8	485

MATERIALS AND METHODS

Two field workers were employed with private vehicle to dispense useful literature in the pre-selected villages. First worker was without navigating system while the second worker was provided with the a smart phone with GPS enabled feature and pre-downloaded Google/Nokia maps used to navigate to pre selected villages .The observations were recorded in terms of travel time and the journey expense (fuel consumption, phone calls etc.).The results were statistically analyzed to determine the significance.

RESULTS AND DISCUSSION

The result of using computer aided navigation system can easily be deduced in the form of saving of time and other expenses that includes fuel, phone calls etc. The observations revealed that time required to reach location 1 by first field worker was 15 min more in comparison to the second field worker (with navigator) and the fuel consumption was also more by 0.5 lt. Similar trend was recorded for other four locations. The time saving of 30, 20, 60 and 15 min. was recorded for location 2,3,4 and 5, respectively .The diesel saving from 0.5 to 2 lt. was recorded for various locations. Field worker 1 took more time and incurred more expense in comparison to field worker 2.On average, the time saved was 140 min (approx 2.5 hrs) and the fuel saved was 4 lt. which sums to an economic advantage of Rs 200/- (Table 2).

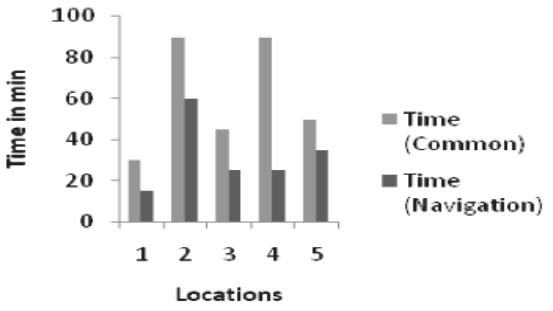
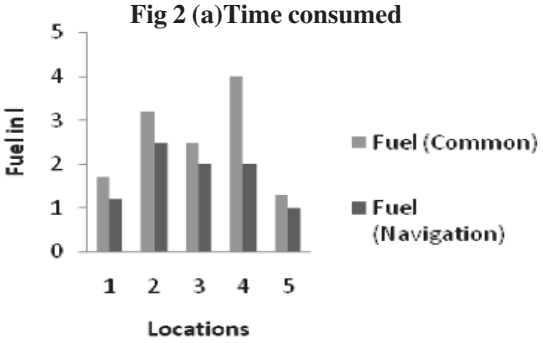


Fig 2 (a)Time consumed



2(b) Fuel consumed to reach locations

Table 2: Time and fuel consumption in common methods and Navigation System.

Sr.No	Destination	Practice Time (min)	Navigation Fuel (lt.)	Savings Time (min)	Fuel (lt.)	Time (min)	Fuel (lt.)
1.	Location 1	30	1.7	15	1.2	15	0.5
2.	Location 2	90	3.2	60	2.5	30	0.7
3.	Location 3	45	2.5	25	2	20	0.5
4.	Location 4	90	4	30	2	60	2
2.	Location 5	50	1.3	35	1	15	0.3
	Total	**305**	**12.7**	**165**	**8.7**	**140**	**4**

The field workers working under field conditions with a navigator saved on time and expenses while the worker without the navigator took more time and incurred more expenses under given conditions. The working conditions were more cordial when a navigator was handed over to the worker. There are few villages in the remote areas where route maps are unavailable, so the future work needs to done in mapping every village of the district in the state. The cost of mobile phone was not considered during the study as mobile is an integral part of every person in today's world.

CONCLUSION

The present study shows that the efficiency of field workers increased with the use of navigator as it saves both time and money. Navigation with a navigator was a better option when compared to traditional methods (following road signs, asking people, over the phone) of navigation. Mobile phones were considered most appropriate due to their compatibility with different navigating software and moreover they are an integral part of everyone's life.

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