Short communication

Future of Machines in Agriculture

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ABSTRACT

Agriculture in India dates back to the Indus valley civilization and in the southern part of the country even before that. Agriculture - the science or practice of growing and cultivation of crops has become a very important factor of the GDP of the country. India a country with 60 per cent of its man-force associated with agricultural activities directly or indirectly is facing an enormous challenge of keeping up with the number of mouths to feed. An enormous amount of change has come in the way agriculture is practiced in the country. Hybrid seeds, tractors, drill machines all have helped in matching the growing needs but it is not enough as by 2030 India will become the world's most populated country with twice the number of people to feed as compared to a decade ago.

INTRODUCTION

Since the independence our population has tripled yet India has made a great growth in the food security ratios. As per the 2014 FAO statistics our food-grain production has quadrupled as compared to what it was at the time of independence. Although India is leading in the global list of producers, statistics show that we won't be able to meet our need which indicates that more innovation and modernization is highly required in the field. As per the 2012 statistics agriculture played a role of 49% when it comes to employment, this clearly indicates that the future of agriculture is majorly dependent on how well we harness the available resources and act sustainably. According to the 2001-2002 census, 58.1 M ha of land was being irrigated in India. The total amount of land which can be irrigated in India is 160 M ha. The pressures of a growing population can be eased if modern machines and agricultural practices and measures are used and implemented. What we all agree on is that if the country has to take off in economic terms, then we cannot have an agricultural sector that employs nearly 60per cent of our workforce and continues to grow at 2% annually. There is an urgent need for Indian agriculture to become more efficient, and aid the country's development rather than burden it.
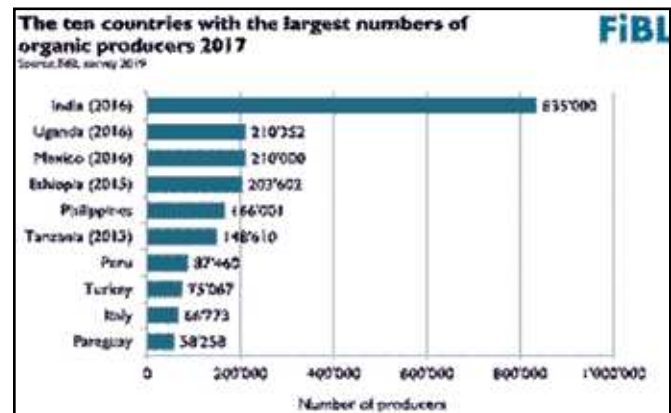
The above mentioned graph clearly shows how the agriculture in India is leaning towards organic farming, which means now we need to reduce our need for furtilizers and replace them with mordern techonoligical ways which will help us analyize our field and hence the need for artificially added nutrients can be decreased.

MATERIALS AND METHODS

A very important aspect of designing materials and methods to overcome our needs is to first

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analysis what drawbacks are there and how we can solve those issues without compromising on our needs for the future, while we use all the current resources to the fullest

Self-Guided Tractor

In India almost 80per cent of the Agricultural activities involve use of tractors, which make them one of the most important machinery involved in agricultural activities. Self-Guided tractors work with the help of a GPS system which helps the tractor to work in the field without a operator present inside. A complex computer is fitted inside the tractor which automatically draws an outline of the field with the help of satellite navigation and the automatic sprayers present at the back of the tractor add the required fertilizers in the soil. This technology with help reduce the need of Skilled labor which will give rise to an opportunity for the un-skilled labor of our country

Crop Analyzers

These small sized sensing devices make the fertilizer distribution in the field more effective as the sense what nutrients are missing in the soil by calculating the last crop sown and also can tell what nutrients the plant requires by using the optical sensors present in them which can calculate the nutrition value of a plant with the help of the sunlight reflected by the plant. This will reduce the run-off in the ground and also maintain the perfect balance in the nutrition of the soil while decreasing the consumption of the fertilizers.

Swath Control

Using this technology the farmer is able to control the SWATH, the machine is using making sure that no land waste is there In the field, also because some fields have irregular shape this technology can help draw the outline of how the setup should be so that maximum use of field is there. Swath technology when combined with Self-Guided tractors make a totally autonomous combination where the farmer just has to add very basic values in the system and after that the system itself decides the layout of the field after which the required fertilizers are added after which the field is ploughed as per the need of the crop

Documentation of the field with GPS

This technology will help the farmer determine which crop should be grown depending upon the nutrient value of the soil, the weather condition of the area and also what the market prices of various crops are. This way every farmer will be able to meet the required demands, which will also help the overall GDP as the production and consumption will become highly co-related. This will help the farmer earn more while decreasing the price of the products for the general public. In this the prices of various food items will be daily updated in the system by the government officials of the area and the farmer has to add the values of its soil which will be shown by the crop sensors after which will the system will use the GPS system to take the data of the weather of the region after which it will calculate which crop needs to be grown so that maximum income is there with minimum effort and minimum use of the resources.

RESULTS AND DISCUSSION

As described, the hypothesis is that new technologies and engineering knowledge are available to perform a change in the paradigm of agricultural machinery. The prediction says that the agricultural field machinery will be redesigned into compact and harmonic units, dedicated for the different operations in the growing system. The expectation is that this will lead to a cost effective system with a low environmental impact. To obtain the results it is necessary to establish the agronomic needs for the different operations. In many cases although the sensor inputs to the implemented values will not be direct in relation to the physical or biological need. This states that, a lot of research is still needed to enable specification of data for the optimal operation. It seems that the technological elements and engineering basis are available to design self-propelled auto guided integrated

tools, which will demonstrate improved working performance in the field and be economically attractive for investments by farmers. The important question is, as always, the size and the time to market.

CONCLUSIONS

It can be concluded that the technology is available for applying agricultural tractors as autonomic units. If it is believed, that this development will progress, it opens for engineering development processes, as expected, for other industrial machinery or tooling systems, where the units has been redesigned drastically, to benefit from the possibilities that opens with the concept of self-propelled autonomic tooling systems. In this way, the possibilities are open for designing new integrated tooling systems, which can lead to optimization of the economic output from agricultural field production and, at the same time, lead to a reduced environmental impact compared to what is seen today.

REFERENCES

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