PRECISION AGRICULTURE, THE KEY TO INCREASED PRODUCTIVITY FOR SMALLHOLDER FARMERS; A CASE OF SOUTH-EAST NIGERIA
#9480

T.O. Eni

D.E.T Services Lagos, Nigeria

e-mail: teddy6893.te@gmail.com; tel: +234 810 257 6622

ABSTRACT

The aim of this study was to analyze the impact of precision agriculture on the farming operations of smallholder farmers in South-East Nigeria. In general, the system of farming in Nigeria lacks precision especially since it is being practised primarily by smallholder farmers and is mainly determined and analyzed using mundane, redundant, and time-consuming technology. This has resulted in uneven food production potential across the value chains. Agricultural Input waste despite its growing scarcity is already becoming a pandemic on its own as many of these referenced smallholder farmers don't apply Precision in their input application. Through my research, while working with farmers in South-East Nigeria I discovered that most of these smallholder farmers don't use precise input application technology and they still rely on old farm management systems which reduces their productivity and general farming capacities. Our introduction of Precision agriculture to them was a great opportunity for them to witness first-hand the accuracy of drones in farm data collection, farm mapping, terrain analysis, crop count and fertility distribution mapping. These amongst others are some of the key variables impacting their farming productivity. These drones reduce farming redundancies and increase speed by up to 10x when compared to the traditional method of farm management presently being utilized by smallholder farmers. They further reduce agricultural input waste by up to 60% thus saving the smallholder farmer 60% of his original capital intended for the purchase of agricultural inputs. This saving can either be utilized for more input or simply used to sort out other needs of the smallholder farmer. Precision agriculture does not only guarantee speed, but it also ensures increased productivity and profitability. Smallholder farmers make up the largest population of food producers in the African agricultural sphere and the key to increasing their productivity lies in precision, from the application of inputs to ensure an increase in yield, to the general management of the farms. Precision agriculture will help smallholder farmers increase their farm sizes because of the guaranteed reduction in wastage of inputs and increased saving of time and resources. This simple tactic will turn these seemingly underserved populations into formidable food producers.

INTRODUCTION

Nigeria relies on about $10 billion worth of imports to meet its food and agricultural production shortfalls with food inflation rising to 22.95% in the first quarter of 2021. Causes of food inflation include conflict, insurgency, kidnapping, and wastage of agricultural input and produce. Nigeria has seen the prices of locally grown food spike to new highs in 2022 further weakening consumers' purchasing power. Using Rice as a case study, in 2021 the total available market size for Rice according to the international trade administration is $3,530million and the total estimated local production was $2,300million leaving about $1,230million for importation. Despite these numbers, Nigeria is Africa's largest producer of Rice and is among the top 15 producers globally, yet imports continue to meet about half of

the country's demand for Rice with Thailand and India as two of the leading import destinations.

Precision agriculture is the future of farming and is necessary for increased productivity in the Nigerian agricultural system. With precision agriculture in Nigeria, Nigerian farmers will efficiently manage their farms especially by reducing waste of input and land both of which are major factors that reduce productivity and food availability in the Nigerian agricultural system. While increasing speed and productivity, precision agriculture will also combat the issue of food insecurity as the nation's population increases daily. Agritech has made farming operations like crop monitoring, survey, farm mapping, soil water analysis, plant stress determination, and input application to mention a few, easy and stressless with increased precision.

MATERIALS AND METHODS

An impactful correlational survey was used to examine smallholder Rice farmers in the South-Eastern Region of Nigeria and their farming methods.

Drone data capture of farmlands and precise surveys were used to show these smallholder farmers the difference between the conventional farm survey method, routine round the farm crop checks and the speed of high-end machines capturing farm data in minutes and producing more precise results on farm variables.

Precision application of Agrochemicals on farmers' farms using input spray drones highlighted the reason precision agriculture is the next big thing. Especially with its speed and variable rate technology, spray drones can control the amount of input required per field and this helps reduce input waste by at least 60%. These drones also spray as programmed in locations they are needed, and this ensures 100% precision.

Interactive DIY sessions and basic training using audio and visual learning materials also aided the acceptance process for these rural farmers.

RESULTS AND DISCUSSION

Effectiveness of Precision Agriculture on the Smallholder farmers.

Impactful surveys showed the level of redundancies that existed in smallholder farmers' farming activities. Most of these smallholder farmers even lack basic input and implements to effectively produce. Also, despite the gross lack of capital to secure input noticed among these farmers, wastage of land and already scarce input was another noticeable factor among these groups of smallholder farmers.

The results of our farm demonstrations and interactive sessions are so far assisting more than 400 individual smallholder farmers to increase their farming productivity. With more precise farm data, they now know exactly how and where to plant, they also benefit from the precise application of input like agrochemicals and effective field monitoring with improved efficiency. Moreover, this farm management model has encouraged them to increase their farm sizes, and this will in turn increase their output.

Subscribed farmers are already seeing the difference in the resulting yield from the adoption of precision agriculture, and upon harvest, they are sure to gain more than 50% more produce than in previous planting seasons. This no doubt proves that with precision agriculture Africa will be a formidable continent when matters of food production are discussed.

As early adopters of Agritech and precision climate-smart agriculture in Nigeria, I and my team intend to duplicate this success in more locations to further increase the food productivity of smallholder farmers in Nigeria because these seemingly vulnerable farmers hold the key to the nation's food security.

FURTHER READING

Farotimi, O. 2021. Precision Agriculture as a Source of Income.
International Trade Administration. Journal on Agricultural Commodities. 3:11-13.