

XMACHINES

PIONEERING AGRI-ROBOTICS IN INDIA

Shortage of labour is one of the key challenges for farmers. Its associated costs are also huge. While mechanisation options are available for the big farmers, the small farmers do not have such options due to small land holdings. To address these issues, Hyderabad based X-Machines has created a miniature tractor-like device called X100 that uses robotics and artificial intelligence to function as an able farm hand. The flagship product 'X100' performs every farm operation beginning with seeding till harvesting with the help of various smart attachments. It is designed ground up to be crop agnostic and to suit both small and large farms alike. The intelligent AI driven attachments take precise care of each individual plant as required by fusing data points from several on-board sensors in-order to achieve optimum yields.



X100 Robot during testing at ICRISAT



X100 Robot during pilot run in Maize at Professor Jayashankar Telangana State Agricultural University



Pesticide Spraying with X100 Robot during farmer's field demonstration

The machine will bring in the required precision in the farm activities. It can be used for seed and sapling plantation, weed management, micro sprays of pesticides, fertiliser sprays and other chores with precision and accuracy. "It can space the seeds or saplings as instructed," said Trivikram Kumar D, Chief Executive Officer and Product Architect of XMachines. Trivikram was a second year student of Mechatronics Engineering in Hong Kong when he first read about the farmer suicides back home. As he continued to probe into farmer problems, he realised that the need of the hour was a tech solution to solve problems that the farmers were facing. Trivikram stayed back and worked in Hong Kong for two years after his course, but continued to spend his free time in research around the agri-tech space. Finally, he came back to his home in Telangana and started ground research with farmers. An overwhelming number of farmers reported the problem of labour shortage and the rising cost of labour on account of the shortage. For the engineer in Trivikram, the solution presented itself: a robot that could perform recurring actions in the field, thereby solving the problem of insufficient manpower.

These Robots can be programmed to work autonomously or controlled through a joystick, he said. The pilots, which have been taken up in collaboration with the PJTSAU, indicate that farmers will be able to save about 30% of the costs that they would otherwise incur completely depending on labour, he said. "There is a severe shortage of labour as a result the wages are increasing. In some cases, labour from Odisha is brought in to handle the work. In many cases, the small farmers have to wait till the labour gets free from working at the large farms. This results in the window period that small farmers have for talking up farm works after rains get reduced," he said. Tractors cannot be used after the plants achieve a certain height. Hand tools are present but they induce a lot of fatigue to the operators due to their vibrations. Typically, the operators do not opt to have continuous operations due to that, Trivikram explained about the farm problems. However, the portable machine that the company has devised can navigate within the rows. It also saves on the crop input costs as it applies crop inputs only to the plants that need them. It has capabilities to identify the plant that is healthy using the available nutrients in the soil. This also helps the farmers in



targeting the sprays as per needs of the plants and not as a block. "About 30 per cent of the plants in a field normally do not need any sprays. They find them from the existing soil," he said. This can be used for chilli, cotton, tobacco and other crops.

XMachines will provide a few machines on a rental basis this crop season. It will partner with players who are already operating tractors, harvesters and other farm tools. It will observe their functioning and make the necessary changes for a wider launch next year. The machines are made in Hyderabad, he said.

XMachines is funded by IIIT-H (International Institute of Information Technology) and ISB-H (Indian School of Business), premier institutes based out of Hyderabad, and is incubated at ICRISAT (International Crops Research Institute for the Semi-Arid Tropics), which is where XMachines Research Lab (XRL) is located. The extensive R&D conducted by the startup over a period of five years has led to IPR (Intellectual Property Rights) protected proprietary cutting-edge technologies.

According to Trivikram, XMachines is committed to transforming the agricultural landscape by ushering in tech-led best practices. "Our robotic products will prove economically sustainable for India's farmers," he says. "We have solid plans to become the market leader in this space and have strong innovative products in the pipeline to cater to every need of farmers, and to make India the food capital of the world".

