AGRI MAGAZINE
(International E-Magazine for Agricultural Articles)
Volume: 03, Issue: 01 (January, 2026)
Available online at http://www.agrimagazine.in
©Agri Magazine, ISSN: 3048-8656

Manual to Machine: How AI Grading is Increasing the Profit of Farmers in Indian Horticulture

*Priyanka Rahul Kodag[1], Sawant Sanket Ramnath[2], Shubham Rohilla[3] and Patil Rajvardhan Kiran[3]
[1]Scientist, ICAR-Indian Agricultural Research Institute, New Delhi, India
[2]Scientist, ICAR-Central Institute of Post-harvest Engineering & Technology, Ludhiana-141004, Punjab, India
[3]Scientist, ICAR-National Institute of Secondary Agriculture, Namkum, Ranchi – 834010, Jharkhand, India
*Corresponding Author's email: priyanka.4.icar@gmail.com

We hear very often, in the Indian mandis, that My produce is good, but I do not get the right price. Grading of fruits and vegetables by a human eye has been decades and decades old whether in a small local market or an export packing center. Judging size, shape and color is done by hand. The lack of consistency in the judgment of a particular human, results in lack of fair payment to the farmer most of the time. Indian packhouses and farms are slowly producing grading systems powered by Artificial Intelligence (AI) and it is quietly slipping in as a revolution. These smart machines are assisting farmers to make more money save on wastages and sell profitably!

Problem with Manual Grading

The history of any fruit, its shine, color, and size are the things that will make it sell in the market for better price. Manual grading is, however, slow, inconsistent and tedious in nature. Most of the fruit-packing facilities have workers who manually grade by hand one after another. The process requires hours of time and there is no uniform response between two employees on what they perceive to be of premium quality. Errors begin to creep in when tiredness kicks in and much good produce may be discarded or retailed at give-away prices. With mangoes, grapes, apples, and pomegranates, the export perfection quality type of fruits a small blemish determines if you will get a premium price or suffer a loss. The result? The farmers receive low earnings and the supply chain loses more.

Artificial intelligence: The Intelligent Grader in the Field

Visualize a machine that will be able to examine your fruit in seconds and do this without any discrimination, fatigue or controversy. This is what is basically provided by AI-based grading systems. They use cameras, sensors and machine learning to identify patterns with myriads of images of fruits. When the fruits are passing through a conveyor belt, the system automatically checks: Hue and maturity - is the produce ripe or unripe, Size and shape - is it regular or irregular? Spots and damages - Are there any spots and damages? Based on this, the AI system automatically grades every fruit as Grade A, B or C and packages them into boxes. The best is that it is much faster than grading manually with an accuracy that is best at more than 90%.

The Benefit of a Farmer: Better Price per kilo

We can take the case of a grape farmer in Nashik Sunil Patil. His cooperative was using manual grape sorting until 2023. One truck load of grapes required almost 10 hours to be sorted by 15 workers. Exporters oftentimes complained of inspectable grape quality, and

Sunil experienced losses as a result of bad quality produce. Last year, his cooperative installed a sorting machine based on AI created by an Indian agritech startup.

The results were immediate: Sorting time reduced by 60%, Labor costs reduced by 30%, substandard exports halved, Revenue increased by 15-20%. Sunil smiled and replied that it has been so easy since we acquired this machine. We have received better prices, and customers are quite delighted.

Efficiency that Pays

AI does not simply grade quicker it grades smarter. With the use of traditional grading, once the produce is blended you can not segregate the good and average effectively. However, AI makes sure that each fruit receives its value. High quality fruits attract a high price, middle quality fruits are transported to the local markets and the low quality fruits are used as juice or processed nothing is wasted. To the farmers and FPOs, it would translate into improved utilization of resources, reduced spoilage and getting maximum out of each batch. AI grading also creates trust when connected with market applications or web-based stores. Buyers receive quality fruit, farmers receive better and quicker payment and the dispute of middlemen decreases.

Enabling AI to reach Small Farmers

It initially appears to be a large company technology, however, in India, startups have discovered how to make it affordable and reachable to farmers. Some install a community grading unit to FPOs or cooperatives whereby individual small farmers are allowed to use the facility and simply pay to use it. The state governments and agricultural departments in Maharashtra, Himachal Pradesh and Punjab are running parallel pilots on the apples, grapes and citrus fruits. Even AI cameras are now getting cheaper. Grading kits can also be portable using a small generator set or solar panel; therefore, they will be ready to serve rural packhouses.

Profitability Through Data

Artificial Intelligence does not just grade but it also gives valuable information. Even on the scan, it is possible to see the information concerning the color, size, and defect rate of the crop. Overtime, this information will help the farmers to know what farming practice has a higher grade. Identify the appropriate harvesting time. Negotiate with buyers since they possess open quality reports based on data. This information will bring about traceability that is greatly required in the international trade by an exporter. And to the farmer, it creates credibility proof that his product is of utmost quality.

Challenges on the Road

There are indeed challenges. Machines should be maintained. Operators need upskilling. The rural areas, where majority of these farms are located, have no strong internet or power supply. Even though the initial cost has been decreasing, it may still be a steep hill to climb by small growers. The government projects like the Digital Agriculture Mission and PM FME Scheme are driving the uptake of smart tech with subsidies as well as training. In fact, a number of FPOs have already started providing AI grading as a service that they offer in the same way a tractor or a cold storage is provided.

A Smarter Future for Indian Horticulture

The future of the Indian horticulture is not a about growing more but selling better. AI grading makes sure that as much effort as the farmer puts into the field, he gets fair returns in the market. It establishes a direct correlation between the productivity and profitability of farmers by reducing losses in addition to efficiency and identification of quality output. As AI systems move from large packhouses to village level centers, the simple answer is this: The more accurate the grading, the more accurate the income. Technology may be changing, but the goal remains the same to make farming more rewarding for those who feed the nation.