

EasyHarvest

Smart Management of Machinery for Rice Postharvest and Mechanization



✓ Background

Inefficient scheduling and the utilization of the wrong type of machinery results in high operational costs, large amounts of greenhouse gas emissions, and crop losses. In addition, the timely procurement of machinery services to meet the need of rice farmers is difficult – scheduling for combine harvesters, in particular, becomes a challenge.

EasyHarvest (easyharvest.irri.org) is an application that addresses these existing constraints to provide better access to harvester services, leading to an improved rice value chain, higher overall income for farmers and contractors, increased sustainability of rice production, reduction of hazardous labor and the increase in smart farming practices.

✓ The Challenge

Agricultural mechanization can increase productivity by reducing drudgery, reducing losses from grains spillage during harvest, and ensuring timeliness of production and postharvest activities.

However, the inappropriate use of machines as well as poor scheduling of harvesting operations among service providers could lessen, if not cancel out, the potential benefits of mechanization. In the rice industry, poor management of postharvest machines leads to high losses, low efficiency and effectiveness, and high cost.

Some of the constraints present in the context of rice farm management are as follows:

- Lack of information and the poor coordination between service providers and farmers
- Poor matching of field conditions with types of machineries resulting in low field efficiency of operations and high losses
- Lack of anticipation of the service schedules and poor management resulting in poor planning for the contractors, low machinery utilization rates, thus low effectiveness

To put together an innovative solution to these issues, the scientists at IRRI implemented a proof of concept in the form of EasyHarvest. Currently, the beta version is accessible as a web application at easyharvest.irri.org and soon to be available at the Google Play Store.

► Potential Impact

The adoption of EasyHarvest would provide farmers basis in selecting best options to book services such as combine harvesters at their own convenience using their mobile device or a desktop computer. Service providers and farm managers would be able to anticipate and optimize scheduling for more effective and efficient use of machines, higher net profits, and sustainable business operations.

The tool could be used as a platform to be financed by subscriptions and/or subsidies and has benefits for the following stakeholder groups:

1. **Farmers** can share information about their field, estimated harvesting date, getting information available machines and their information, and booking the ones matching their needs
2. **Service Providers** can share information about their combine harvesters and harvesting schedules all displayed and geo-located on a real-time map, which also helps them keep track of their assets while out on the field
3. **Farm Managers** can see a proposed optimal schedule for each field available and optimized management accordingly
4. **Combine harvester manufacturers** benefit from increased visibility of their name on the platform used by the end-users
5. **Policy makers and researchers** could use the collected information to inform national policy and key scientific studies

Given the current levels of post-harvest loss, we anticipate that the results of using EasyHarvest to be

- Reduction in harvesting costs by as much as 10% due to increase of efficiency and effectiveness of combine harvesters
- Reduction in postharvest losses up to 5% due to securing the optimal harvesting in terms of harvesting period and the matching between crop and machines.
- Reduction in greenhouse gas emissions in rice production up to 5%, due to the reduction in losses and wastes

✓ How does it work?

EasyHarvest is both a web based tool and android application providing smart links between the farmers and machinery service providers. It is initially designed for optimizing the scheduling of combine harvester services corresponding to the actual needs of farmers and availability of the combine harvesters. It uses algorithms that consider field conditions, anticipated harvesting dates, and available infrastructures based on observed data. As with most data driven tools, EasyHarvest becomes “smarter” as more data parameters are used in its algorithm.

As of mid-2019, it has the following core components:

- Access to a database containing field conditions, including location and other harvesting-related parameters
- Access to real-time geo-location of combine harvesters via satellites
- A self-service data management dashboard that can be accessed by account holders to manage their machineries and/or farms
- A self-service booking of machinery done by the field owner, with only viable options of machinery shown; also employs a ‘smart recommendation’ that suggests the best machine to book, given select parameters such as distance and cost

► Next Steps

Upgrade EasyHarvest:

- Optimized management and operation of all farm machinery, such as transplanters and straw balers
- Smart fertilizer and pesticide application with drones via image processing
- Smart postharvest management (drying and storage, modeling and remote sensing based)

Pilot EasyHarvest :

- Smart business models in cooperation with private sectors partners, in the Philippines, India, Cambodia, and Thailand.
- Sustainability analysis including life cycle assessment to evaluate the economic, environmental, and social impacts.

In a nutshell, IRRI hopes to create a more robust decision support tool to promote best practices into the rice farming value chain for sustainable rice production.

- A resource-optimization option especially tailored to larger scales, wherein both field and machine resources are managed by a single entity, which fully automates the matching of harvesters to fields, given a number of pre-defined parameters such as harvesting dates, and capacity of each machine.

In the end, this application aims to serve as a platform for rice actors (farmers, machine manufacturers, service providers, rice producers, traders, research institutions, policy makers) to support sustainable rice production.



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