

CII AGRI HACKATHON - AGHACK 2016 19 – 22 November 2016 | Chandigarh

HACKATHON CHALLENGE THEMES

AgHACK 2016, First CII Agriculture focused Hackathon strives to bring together young minds to explore and test the power of Ideas that have the potential to address some of the most pressing challenges related to sustainable practices confronting Indian agriculture.

The participating student teams will be given the following Challenge Themes to choose from and work out the solutions for any one during the hackathon period. The students are expected to come up with technology solutions in the form of mobile or web applications; device prototypes. The teams will have an opportunity to present their solutions before the Jury and the potential ones will be further incubated and worked upon towards commercialization and scaling up.

The solutions will be evaluated for their Relevance; Effectiveness; Novelty; Ability to Scale; and Go-to-market plan.

1. Soil Health

Soil health is an important determinant of crop life and hence productivity which in turn impact the net returns to farmers. Often limited knowledge about soil health owing to issues related to availability and access to accurate information related to nutrients, pollutants, etc impede farmers from taking decisions related to application of chemicals, fertilizers and others. It is well observed that soils in certain parts of India are overfed with fertilizers and there is a severe imbalance of NPK while there are parts where there is an underutilization of fertilizers.

While soil testing has been in practice, there are certain practical challenges which farmers face in terms of the method of testing; time taken to collect samples, take it to the laboratories, undertake actual testing and share the results. The Government's flagship Soil Health Card Scheme aims at ensuring that farmers have better access to soil testing services and are able to use the information for making smart choices to adopt sustainable agricultural practices.

Currently, the challenge remains in how to ensure that the farmers are able to avail soil testing services in a quick and efficient format cutting down the time taken to undertake testing preferably through mobile testing facilities closer to the farms. Also, exploring non-chemical methods of soil testing that allow farmers to access information readily and further integrate it with the recommended dosage of chemical and fertilizer usage.

The potential gains to farmers from overcoming the challenges related to soil health testing and using the information effectively are many – better understanding of soil health condition and hence the need for application of inputs; economizing usage of inputs and hence saving on costs and improving the productivity of crops; and finally improving the net returns in addition to adopting sustainable agricultural practices are that environmentally less damaging.

The USP of the solution will be in designing portable, easy to use and interpret soil health assessment tools and devices through which farmers can access information in a timely manner and utilize the information for effective decision making. At the macro level, it will allow mapping of areas according to soil health conditions for strategic interventions both at the policy and business levels.

2. Crop Health

Every year in India, pests and diseases eat away, on an average, 20-30 percent food, worth about Rs 45,000 crore, produced by the farmers. Food crops compete with 30,000 species of weeds, 3,000 species of nematodes and 10,000 species of plant-eating insects. Hence crop protection plays a vital role in controlling pests and diseases that infect, consume or damage crops thereby significantly reducing the quantity and quality of food production. Assessing crop health to prevent potential damage is important and extremely time sensitive. It is critical for the farmer to assess the risk of crop damage as well as contain onset of any damage.

The challenge lies in farmers across geographies, particularly those located remotely and having limited access to agri extension services and personnel to understand crop health on a periodic and routine basis, assess potential risk associated and hence undertake preventive measures. Also, often commonly prevalent pests, weeds and associated diseases are identifiable and there remains a risk of new and/or rare weeds, pests and diseases that are not understood or identified easily.

Hence access to methods of assessing risk factors as well as taking measures to prevent spread and outbreak of damage is important for farmers to protect crop life as well as prevent income loss. Currently, much of the advisory on crop protection is undertaken through extension services with personnel visiting farms and/or through mobile phones. While this is important and helps farmers in difficult times, there are certain gaps which need to be addressed through better technology and application.

Considering the extent of crop protection issues in India, it is most important that farmers have access to information, images that allow him to assess any potential risk, readily identify the weeds and pests, and further map it with the preventive measures and take a timely decision to prevent crop loss. Hence a technology that brings together information about all possible pests, weeds, etc and the diseases associated as observed on the crop (leaves, stem, root, etc) and most importantly the images so that it is easily identifiable by a farmer standing in his field and further maps it to the solutions will allow the farmer to overcome the time involved in human interface.

3. Agricultural Marketing Network

Agricultural marketing plays an important role in improving the livelihood of farmers as well as overall development of the agricultural sectors. Currently, bulk of the marketing is done through Government regulated market yards and sub-yards and it is commonly observed that the marketing network is fragmented and overcrowded with functionaries at various level. The original objective of creating a robust marketing network controlled and monitored by the Government was to allow farmers the ease of selling their produce through regulated channels at fair prices and safeguard their interests. However, over time, agricultural marketing has lost its true essence and farmers have not been able to benefit as much in terms

of higher price discovery and realization and more often subject to lot of intermediation in transactions through the marketing channels.

Recently, the Government has rolled out the ambitious project of National Agriculture Market (NAM) which aims to connect various markets across India seamlessly through electronic platforms. The key objectives of NAM are to reduce the level of intermediation in marketing; rationalize fees and taxes related to market transactions; and allow farmers to benefit from higher price discovery and realization. NAM also has the advantage of allowing buyers and sellers to transact on a virtual platform without having to bring their physical produce to the markets.

The challenge with respect to agricultural marketing lies in seamless matching of demand and supply for a particular quality of produce and allowing farmers higher price realization without going through levels of intermediation and consumers to benefit from better prices. Given the spread of production and consumption centres, the challenge lies in mapping these efficiently and reducing the supply response time to demand. While majority of farmers have access to price information across major markets in India through mobile phones, information about demand is not as easily available. Also, access to price information does not necessarily result in higher price realization due to a host of factors like transportation, quality deterioration, demand situation at the market at the time of actual delivery. As observed, perishable commodities such as fruits and vegetables are most susceptible to price fluctuation and quality deterioration due to limited shelf life results in wastage.

While NAM still requires a farmer to be at the market space, technology which allows the farmers to share information related to quantity, quality and location at his end and find interested buyers with the quantity and price they are willing to offer can enable seamless transaction without any physical market interface. Also, mapping buyers and sellers in the vicinity with respect to a particular geography can help gauge the real demand and supply situation and hence the price that should be offered. This can be extended to pooling common services such as transportation, assaying of quality, etc through a taxi model approach.

4. Data processing and Analytics

As observed, a plethora of information and data related to farming and most commonly, weather, price, inputs, etc is available in various formats and often in regional languages and accessible to farmers through various mobile applications. While such information is most critical for farmers to make smart choices regarding what to grow, how to manage the farm and where to sell, often the analytics is not robust to enable them to take these decisions.

Farmers would benefit most from a package of information supported by analytics and interpretation in a format that is easily accessible and understood by them. Information related to soil condition, ground water situation, weather forecast are critical factors that will help farmers determine the kind of crops he should grow and hence the kind of inputs he should use be it seeds, fertilizers, chemicals, etc and further link it to the demand for these crops, and their potential buyers.

Such a package of information would require pooling of information spread across various locations and supported by analytics that can be further interpreted in a manner that the farmer is able to understand

and apply for taking the decisions. Going forward, such data analytics can enable farmers to manage their farms better and benefit from advance information about demand and potential prices.

5. Single Window for Crop Insurance Benefits

Crop insurance penetration is quite low with only 22 per cent being covered under crop insurance (in 2014). While the coverage was higher in some states — especially Rajasthan and also Chhattisgarh, Odisha, Bihar and Karnataka — it was hardly a tenth or less in Gujarat, West Bengal and Uttar Pradesh (see table). While low coverage is an issue so is the extent of coverage and the ease of availing the benefits of the cover when the farmer is in acute distress. While the extent of cover and rightful claim are determined by the level of damage and the supporting evidence and clearances, technology can play an important role in capturing the real situation and integrating various departments and institutions which play a role in finally enabling the farmer to claim the benefits.

A single window which has all the necessary fields of information that the farmer needs to furnish and other documentation such as validated reports from weather department, on-farm images, insurance company representative's feedback and helps reduce human interface can benefit the farmers.