The Review of Contemporary Scientific and Academic Studies
An International Multidisciplinary Online Journal
www.thercsas.com

ISSN: 2583-1380 Vol. 2 | Issue 8 | August 2022 Impact Factor: 4.736 (SJIF)

Role of Platform Economy in Agricultural Sector in India

Javad Ghalambor (ghalamborjavad@gmail.com)
Assistant Professor, Acharya Institute of Management & Sciences, Bangalore, India

 Crossref/DOI: https://doi.org/10.55454/rcsas.2.8.2022.005

Abstract: *India is a land of variety of geographical diversity due to which agriculture has gained prominence since the existence of civilization. This is the reason why agriculture is the backbone of India. Since ages, traditional practices have been followed in cultivation and marketing of agricultural products. But the drastic transformation in technology has created opportunities for farmers to explore, expand and increase the productivity. The following study provides detailed information regarding digital platforms in agricultural sector, their role in agriculture infrastructure transformation and connection of farmers with traders and consumers along with technology-driven innovations.*

Keywords: Agriculture Infrastructure, Agricultural Sector in India, Platform Economy

Introduction

Platform economy in general, refers to online market places. But vastly it also includes social and market place interaction and a set of digital frame work for the same. "Platforms are to the network age what the factory was to the industrial revolution" (Policy frame work for digital platforms-moving from openness to inclusion). There is a rise in B2C and B2B market place platforms for the procurement of input cultivation practices, harvesting practices and marketing the produces. Fintech companies are also tied up with these platforms for ease of payment through simple online payment schemes.

The agricultural sector is facing with sever technological drawback especially in the area of agro products marketing platform technology helps to overcome this situation and make the agricultural market wide and efficient. The goal of this paper is to examine how the digital economy connects farmers, traders and consumers.

Review of Literature

Regina et al (2011) has analyzed that the agricultural has suffered adversity during the past decade despite high overall growth rates experienced by other sectors in the Indian economy. Increasing growth rates in the farm sector would require, among other things, a more equitable use of fertilizers. Thus far, the trends in fertilizer use have been uneven across states and across farms of different sizes. Reform options for fertilizer policy should take into account these realities as well as India's continued need for food security. The reform process itself has made very modest progress.

Deshmukh et al (2014) concluded that subsidies make some positive & negative impact on agricultural sector of India. In last few year percentage of agricultural sector in GDP is decrease but at same time production of agricultural sector is also increases with investment. The increase in population & inflation is measure factor for low contribution of agricultural sector in India GDP. But agricultural subsidies play vital role in growth of agricultural sector in India. Without help of subsidies development of agricultural sector is very difficult. Due to corruption & ineffective management of subsidies in India, it has not reach to end users i.e. farmers & another side due to illiteracy of farmer regarding agricultural subsidies, he can't take benefit in farming & faced financial crisis.

Panagriya (2001) notes that with re-introduction of Open General Licensing in 1976, tariff rates for imports in 1980s were raised abysmally high to avail tariff revenue from quota rents although large exemptions were given on these goods. With the reforms measures, removal of import licensing and curtailing tariff rates, there was considerable buoyancy in exports in the first half of 1990s which although further slowed down due to decline in world trade. This robust performance of exports helped to abate trade deficit from an average 2.7 per cent of GDP during 1980s to just 0.9 per 85 cent from 1992-93 to 1995-96. But, with East

Asian crisis, came the meltdown of exports thereby again widening the gap to 1.6 per cent during 1996-97 to 1998-99.

Kumar, N. (2001) & Panagriya, A. (2004) divides the policy changes in the external sector into three phases viz. 1950-75 with tighter control that represented a closed economy; 1976-91 was the period when liberalization in this rigid structure took place especially in the second half of 1980s and then the third phase commencing from 1992 which entailed a series of systematic reforms.

Fourier Analysis of Historical NOAA Time Series Data To Estimate Bimodal Agriculture, (21 DEC 2007): In the present study, NDVI time-series 10-day composites derived from NOAA AVHRR data were used to estimate bimodal agriculture areas (where there are two seasons of cultivation per annum) using Fourier approach. The NDVI sequence was transformed into harmonic signals and the amplitude and phase of first and second harmonics were used for the analysis. A classification was applied, using a decision tree, to discriminate bimodal agriculture area from other land cover types, principally over the Asian sub-region. When the amplitude of second harmonics in a sample region, where bimodal agriculture is predominant, was compared with the irrigated area statistics developed by FAO-UF, a linear relationship was determined. The derived function was applied to transform the amplitude of second harmonics to bimodal agriculture area estimates. 2007

Thus large-scale irrigation projects appear on the map and provide an encouraging initial result. This result indicates that estimating bimodal agriculture area that is one of the main sources of information for irrigated area mapping at regional or global scale, with improved accuracy possible if greater spatial, temporal resolution is achieved, for instance from MODIS or SPOT vegetation time series NDVI data, combined with an improved decision tree classification algorithm and a greater precision and geographical distribution of ground-truth data. The principle merits of this approach are automation and repeatability.

Mountain Agriculture Extraction from Time-Series MODIS NDVI Using Dynamic Time Warping Technique,(15 Feb 2017): The study attempts to extract Mountain Agriculture using an optimized Dynamic Time Warping (DTW) algorithm having endpoint constraints. The DTW was applied over a time-series annual stack of Normalized Differential Vegetation Index (NDVI) using a set of reference time series profiles for three agriculture classes (i.e. double cropping, single cropping, and horticulture) and the pixel-wise similarity is examined to identify the agriculture classes. In addition, Euclidean Distance (ED) was used to compare DTW-based result. The detection accuracy of each class was assessed using Google Earth-based agriculture sample, and the spatial agreement of resultant map was assessed with high-resolution reference data using Pareto boundary technique. The sample based accuracy evaluation reveals that DTW algorithm performed better for double and single cropping agriculture detection in compared to the horticulture. Overall, DTW-based agriculture map (0.81 ± 0.01) yielded higher overall accuracy in comparison with ED-based agriculture map (0.75 ± 0.01). The Pareto boundary-based spatial agreement analysis using high-resolution reference data also shows the

Dominant performance of DTW based agriculture map than an ED-based map. DTW performed better than ED, in terms of optimal distance (OD), in ten out of eleven districts. However, reliable spatial matching (OD less than 0.23) between DTW-based map and reference agriculture map was observed in lower elevation region, especially in Hamirpur (OD = 0.06), Bilaspur (OD = 0.09), Shimla (OD = 0.19) and Una (OD = 0.20) district.

Spectral Indices for Precise Agriculture Monitoring (03 Jan 2002): This paper presents two main objectives of a multi-year study applying remote sensing to precision agriculture: (1) developing new spectral indices for wheat monitoring, and (2) producing an interpretation key for mapping vegetation features with spectral indices. Agricultural monitoring with remote sensing utilizes and maps the spectral reflection of specific vegetation features. These are the indicators of plant development and crop condition. Over the years, a number of spectral indices have been developed, but the ultimate combination of information required by the farmer, and the capability of remote sensing to map this information, has not yet been achieved. The study, which lasted three years was performed simultaneously, collected vegetation and remote-sensing data. The study aimed to improve the current abilities of remotely sensed agriculture monitoring. Indices were developed relating to various features of wheat. These indices

map the current conditions of the crop, such as nitrogen in the leaves, and predict the yield. Evaluation of these indices, and already known indices, shows that each can be used to map different crop variables.

Ground Based Digital Imagery for Grassland Biomass Estimation (04 Nov 2003): Above ground biomass was estimated on the short grass prairie of eastern Colorado using ground based conventional (RGB) digital camera imagery. The accuracy and efficiency of image-based estimates were compared with clipped biomass measurements. Field measurements of aboveground biomass were obtained on three grazing treatments and three sample dates (phonological status). Grazing treatments did not significantly affect (p>0.10) estimates of clipped green biomass taken from digital images. However, plant penology, green biomass estimates from images, and the interaction of plant penology and green biomass estimates from images significantly affected clipped green biomass measurements (p≤0.04). Analyzed images provided fair estimates of total clipped green biomass (R^2 = 0.55) and clipped green biomass without cactus (R^2 = 0.73) when plant phenological status was included in the models. When plant phenology was removed from the models, the variability explained by green biomass estimates from images declined to 25% for clipped green biomass, and 32% for clipped green biomass without cactus. Thus, results showed that plant phenological status was the most important variable in the prediction of green vegetation biomass. Results indicated that the usefulness of RGB digital camera imagery for green biomass estimation is limited for the short grass prairie.

A Handy Imaging System for Precision Agriculture Studies: An inexpensive imaging system able to take various narrow-band images and placed on platforms of various heights can be very useful to many remote-sensing studies, particularly for researchers in precision agriculture areas. A handy imaging system, composed of an Electric EDC-1000L monochrome camera, a Canon PHF6 1.4 lens, a set of Andover band pass filters, and an Advantech PCA6751 single board computer, was built up and installed with corresponding self-developed application software. The system had been deployed on platforms such as a mobile high-lift crane and helicopter to acquire various narrow-band images. This simplified imaging system may help greatly in performing validation tests on many stress-identification indices and related algorithms derived from ground spectrora diameter measurements.

Data

This data is collected from various websites and journals which are secondary in nature.

A. **The various digital platforms by the Government of India are:**

- **NITI Aayog:** NITI Aayog has started a scheme called Startup AgriIndia Schemeto subsidize digital startup in agriculture. It is a National Digital Market place for trading agricultural commodities through Digital Platform.
- **mKRISHI Platform:** It is an agrotech startup which is used for identifying best cultivating practices, for protection against various damages due to weather conditions, for selecting appropriate seeds of a particular form from a variety of seeds. It also provides information regarding market prices of different farm produces and input availability. It also provides information on various plant diseases and curation for the same.
- **e-NAM:** The electronic national agricultural market was launched in April 2016 to create a unified national market for agricultural commodity by way of connecting existing APMCs through online networking.
- **Agmarket:** It is the first e-governance project which was set up in the year 2000 in view of strengthening agricultural marketing system in India.
- **Agricultural Commodities Exchanges:** It is a future trading platform for agricultural commodities in India. It consists of

a. National commodity and derivatives exchange ltd (NCDEX)

b. Multi commodity exchange of India ltd(MCX)

They were introduced in the year 2003 mainly to mitigate the price risk of farmers.

- **Indian Farmer's Fertilizers Co-Operative Ltd (IFFCO):** It is the world's largest fertilizers o-operative federation established in India. It has 40000 member cooperatives with a massive cooperative market with the help of creation of e-platform.

B. The various Digital Platforms by private sector in agricultural are:

- **Reuters Market Light Free Mobile Application (RML Agtech):** It is an application which connects farmers to various information services through SMS and toll free number. It is high engaged in content formats such as; Advisory videos, podcasts, imagery, and also contains many innovative features consisting of chats with agriexperts and lead farmers so as to create a network of social community on the application. It also engages agri communities and agri stake holders through its Digital Platform.

The various features of this application are:

- 6 day taluk level weather forecast
- Historical updates on 6 crop market combination
- Unpredictable weather protection by warning or alert
- Direct connection with various traders at district level to understand the current and future supply trend
- Inputs from sowing to harvesting on a timely basis
- Suggestions for increase in productivity
- Communication of policies, government schemes, subsidies, health of the crops and other finance related information
- Latest updates regarding key agricultural practices using technology

- **Stellaps Technologies:** This startup is mainly for dairy farmers it aims at optimization and monitoring of services. Its main focus is on small and medium scale farmers. It operates using cloud mobility and data analytics as tools to improve production of milk, procurement as well as cold chain. It also boosts animal insurance and farmer payments.
- **eKutir Global:** It is a digital platform connecting marginal farmers with stakeholders through online and mobile based applications across the value chain. It connects the farmers with soil testing labs, banks, food processing units, suppliers of fertilizers, suppliers of high yield variety seeds, and branded retailers. A part of its service is Agri Suite, which is a one stop solutionfor all the requirements of farmers such as training to use the applications and information about the field pattern.

It also helps the farmers maintain and repair the products used for agricultural production along with advisory on supplementary components and other marketing services.

- **Ekgoan Technologies:** It is IT based network integration.

Ekgoan One Village One World network is a mobile communication technology which offers a range of services to farmers.

Statistical data on platform economy in agricultural sector:

As per the government estimates, India is one of the top 6 active geography for investments in agricultural technology after US, Canada, UK, Israel and France. The investment in this field is over USD 313 million into Indian startups and SMEs. India is the second largest fruits and vegetable producer in the world as per 2015-16 report. It is also the second largest producer of sugar and it is the leading country in coconut production. The global market for precision agriculture is expected to reach a market size of over USD 6.34 billion by 2022 with an expected growth rate of 13.09% annually. India and China are expected to grow annually at the rate of 18.29% until 2022, the fastest growth projection. The mKRISHI Platform has 414 million subscribers of mobile services in rural India alone as per statistics of 2014-2015. The e-NAM

Platform has reached from 250 to 585 markets. At current scenario 9.87 million farmers, 109725 traders are registered on the eNAM Platform. There is around 100million soil health cards distributed in the country as per data of 2015-17 and a mobile app for soil health has been launched to help Indian farmers.

Transformation of Agricultural Sector due to Platform Economy

In India, Agricultural Sector contributes 16% to GDP. It is a source of employment for 49% of the population. The fastest growth is projected by India and China with an annual growth rate of 18.29% by 2022.India's expected agricultural income would be doubling by 2022. The Target of Govt. is to increase the avg. Income of farmer household is at current price USD 3420.21 by 2022-23 from USD 1505.27 in 2015-16. India is transforming itself through Digital India by way of direct application of digital technology in Agricultural Sector; technology such as remote sensing (via Satellites), Geographic Information System, crop and soil health monitoring, live stock and farm management. Government of India will provide USD 306.29M for computerization of primary Agricultural Credit Society (PACS).Agri-Udaan Program-It is a program to monitor and mentor startup so as to enable them to connect potential investors. Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA) is a compensation scheme by the Government of India along with private agencies which ensures that farmers get fair prices for their produce in the country.

Platform economy in connecting farmers, traders and consumers: As per the statistics Indian online grocery market is expected to reach USD 40 million by the end of 2019 and is expected to increase to 141% by the end of 2020 as it is growing at a compound annual rate of 62%. Due to growing concern for food safety, there is an adoption of food safety and quality mechanism such as Total Quality Management which includes ISO 9000, ISO 22000, Hazard Analysis and Critical Control Points (HACCP), Goods Manufacturing Practices (GMP), Good Hygienic Practices (GHP) by food processing industries.

The various platforms which offer marketing of agricultural produces, connecting farmers and traders for mutual benefit and also with the customers are:

- **Ninja Cart:** Ninja cart is one of the popular online platforms for B2B and B2C businesses. It tackles the toughest supply chain problem in India. Since India is the second largest fruits and vegetable producer in the world, this platform connects these farmers directly with retailers or business for the benefit of both farmers and consumers. Famers get better prices along with consistent demand for agro products as well as retailers can procure fresh fruits and vegetables at competitive prices directly from farmers. It is launched in 7 cities connecting 12000 farmers with traders and retailers by employing 1200 people. The delivery is within 12 hours from farm to store. Ninja cart is among the 42 most innovative startups in India as per INC42 media. It has an opportunity of USD 50 billion (BAIN, Google and OMIDYAR Report, 2018).
- **Custom Hiring Centers:** It is the model for rental of tractors and other farm equipments with the objective of encouraging rural entrepreneurship as well as fast tracking mechanism of Indian agriculture
- **DestaMart and DestaTalk:** DestaMart is an E-Commerce platform for agri input supplies, fertilizers, pesticides and seeds to the rural market. DestaTalk is a platform which provides agri inputs to agri store owners and also provides information related to agricultural sector.
- **Big-Haat:** It is also one of the agri commerce startup in E-Commerce with the objective of saving money of farmers. It was started in January 2015 for providing quality agro inputs and accessories through online platform.
- **E-Chaupal:** This business platform consists of a set of various organizational subsistence and interfaces connecting Indian farmers to International market. It is initiated by ITC. It has 3 different layers with different level of geographical aggregation which are characterized by 3 key elements;

- Infrastructure –is a place where transaction takes place (physical/organization)
- Entity (person or organization)- this is where mounting of the transaction takes place.
- Geographical coverage

ISSN: 2583-1380 Vol. 2 | Issue 8 | August 2022 Impact Factor: 4.736 (SJIF)

- Village level Kiosks with e-chaupals: Here, the local farmers who are trained by ITC manage each target farmer within the reach of 15 km.
- There are Brick and Mortar infrastructure called hubs which reach targeted farmers within the reach of 25 to 30 km. they are managed by traditional intermediary who have local skills and knowledge.

- **I Say Organic (ISO):** It is a Delhi based online portal setup in 2012 for food retailing. Organic products are marketed through ISO website on a daily bases where orders are taken over by mobile or through online and the deliveries are within few hours. The website accepts cash on delivery, card or online banking.
- Amazon has entered into food retail sector due to the liberalization ofFDI policy in 2016 which allows for 100% FDI as long as local sourcing requirements have been met. Similarly, Ask-Me-Grocery.com, Snap deal, Freshfalsabzi, Peppertap, Local Banya and Bigbaskethave also started grocery. Orders on Freshfalsabzi websites can be through online or by calling any time of the day for delivery of products on the following day in 3 time slots.

Discussion

The statistics have been proved that a large number of farmers have been included with the digital platform due to various initiatives taken by government and private sector. Although many farmers are still reluctant to use digital platform due to traditional agricultural practices, lack of knowledge and lack of awareness, India is evolving itself for the big change in agricultural infrastructure. Indian farmers still depend on physical APMCs and middlemen due to warehousing facilities, credit facilities and other services provided by them. India will witness a huge growth in this field in the coming years. Farmers are gradually turning towards digital economy for information regarding agriculture, supply chain, market availability and technological advancements in this sector. The estimates have shown substantial increase in investments into technology-driven innovations for increasing the productivity of agricultural yield, providing fair prices to the farm produces, availability of global market by way of exporting the products, recognition of farmers and traders through online registration, and providing solutions for problems faced by small and medium farmers.

Conclusion

The study has thus informed about the innumerable technology driven agricultural digital platforms and opportunities available in this field. Therefore, more steps taken can unburden the farmers of their day-to-day problems. This can bring about a huge transformation in Indian society and economy.

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