

STATUS OF AGRICULTURE IN INDIA

Dr.C.SUBATHRA



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STATUS OF AGRICULTURE IN INDIA

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About the Editor



Dr.C.SUBATHRA, working as an Assistant professor of Commerce in Pioneer Kumaraswamy College, Since 2013, she has 17 years of Teaching and Administrative experience in schools, Colleges and NGO's in Kanyakumari District from 2002 to 2019. Her research started in 2006 and had awarded M.Phil in Commerce from M.K.University in 2007, and awarded **Ph.D in Commerce from Manonmaniam Sundaranar University**, Tirunelveli in 2015, now acting as a Research Supervisor under Manonmaniam Sundaranar University, Tiruunelveli and Guiding M.Phil and Ph.D scholars. She had qualified for the award of JRF and NET in June 2011. She had participated more than **100 National and International Seminars, Workshops and Training programs** and had published **49 Research Articles** in the National and International Journals/Books. She is a qualified NLP and Soft Skill Trainer. Her interest over research on Social sciences made her to acquire knowledge on various other disciplines thus completed **M.A.Sociology, PGDHRM and M.Sc.Psychology**. She acted as the resource person in 29 National and International Seminars, Conferences and guest lectures and delivered her expertise. She had received **2 Best paper and 2 Best Paper Presenter Award** in National and International Seminars/Conferences, "**Best NSS Program Officer Award**" for the Year 2016-17, from Manonmaniam Sundaranar university, Tirunelveli and "**Dr. Radhakrishna Shikshana Ratna National Award**" for remarkable achievements in the field of Teaching, Research & Publications on June 2018. **Agimsai Gandhi Award – 2019** from Gandhiya Makkal Iyakkam, **Kaviyarasar Kalaimani Award – 2019** from Kaviyarasar Kalai Tamil Sangam. As Honorary President of Cape Research Forum, She had organized several Seminar, Conferences Workshop and Award programs for Researchers and also published **7 Books with ISBN and A Journal with ISSN**. She actively involves herself in social activities.

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AGRICULTURAL POLLUTION AND ORGANIC FARMING

***ANWESHA CHATTOPADHYAY**

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ABSTRACT

Pollution is a global phenomenon and it has its own various ways to destroy nature. The three most important components of nature, namely air, water and soil are mostly affected by different types of pollutant which are mainly the outcome of human development. Human race claims to make the earth a better place to live in with all its advanced technology but eventually making it a worse place for the generations yet to come. For any nation, agriculture is a pillar of economic development and in India it is the highest contributor of GDP. Agriculture is important for livelihood and none of the nations can even survive and prosper without it. It always has a positive impact on society and economy but it also has negative effect on environment. This is how agricultural pollution comes in the picture.

Keywords: Agricultural pollution, Organic farming, Chemical fertilizers, Harmful pesticides, Health hazard.

INTRODUCTION

This term is defined as the damage and contamination of food product that occurs due to various farming practices. It not only brings pollution to the environment but also is the reason of different health hazards. It degrades and distorts the ecosystem. This particular type of pollution spoils soil, air and water by its various pollutants. Even the aquatic ecosystem is disturbed.

In this paper, the effects of agricultural pollution are discussed. Also, how organic farming can act as a saver from this type of pollution is also discussed. Finally, a primary data survey is conducted to find out the awareness of people about organic farming and organic food products.

EFFECT OF AGRICULTURE ON AIR:

- **Use of fertilizers:** Factory made chemical fertilizers is available in huge quantities and helps in farming and growing crops immensely. They are mainly used for fast and better growth of crops and for increasing the fertility of the soil. But unfortunately,

these fertilizers affect the air badly as they produce nitrogen oxides like NO, N₂O and NO₂, according to Savci (2012). There are Ammonium fertilizers that result in producing Ammonia gas, which on reaction produces Nitric Acid that eventually give rise to acid rains. According to Kongshaug (1998), there is emission of 1.2% greenhouse gases from the fertilizers into the environment.

- **Agriculture burning:** There is a practice of burning the crop residues in order to clear land, shrubs, pests and to provide nutrition to soil to get better crops next time. But this causes air pollution by creating smoke and particulate materials. These are harmful for health and also such kind of practice during winter season has invited accidents. This ritual also produces Carbon, Carbon Monoxide, Carbon Dioxide, Sulphur Dioxide and Methane. All these gases not only contribute to air pollution but also bring bad effect on crops that is consumed by people. In north-western region of India, this is practiced twice a year, once in April-May and once in October-November. Huge problem is faced during the latter period as the air during this time is dense and days are shorter, and as a result smog is created. Northern India, particularly Delhi has become famous for such smog during this time. Although this burning is practiced in Northern states, the North-Westerly winds blow the black carbon particles and greenhouse gases to the entire Indo-Gangetic Plains upto the southern state, Telangana. According to reports, in 2017, the air quality was so poor that the schools were forced to shut down for many days to protect children from adverse health consequence.
- **Other reasons:** Rice fields are source of Methane gas as the paddy fields are flooded with water according to Zhuang et al (2009). These type of arrangements are very favourable for giving birth to methanogenic bacteria and hence mixing methane gas in air. Besides, particulate matter which is a mixture of sulphate, carbon, dust particles, smoke, small droplets of liquid etc. also contribute to air pollution. This matters are resultant of various methods to prepare fields, burning crop wastes and so on.

EFFECT OF AGRICULTURE ON WATER

- **Use of Fertilizer and pesticides:** Chemical fertilizers and pesticides are mixed to the soil in order to better and fast growth of crops and to protect them from pest. But these fertilizers get mixed to the water bodies near to the agricultural lands. These chemicals have adverse effect on the quality of water and the organisms and plants residing in the water.

- **Other various problems:** Problems like waterlogging, erosion, salinization, desertification occur due to agriculture. Recently it has been found that salinization of water bodies is a bigger problem than soil salinization and it had become more widespread. Apart from these problems, water quality is also degrading due to toxic salts and agrochemicals. Elements like arsenic and selenium are found in water bodies in recent years.

EFFECT OF AGRICULTURE ON SOIL

- **Use of pesticides:** Overuse of fertilizers and pesticides lead to degradation of soil in many countries. If a large quantity of this chemical pesticides and fertilizers are mixed to the soil, they give birth to heavy metals like Arsenic, Cadmium and Lead, Atafar (2010) said. These elements obviously make the soil highly toxic. These pesticides and fertilizers help a lot in agriculture by increasing crop population but unfortunately they have negative effects too.

EFFECT OF AGRICULTURE ON HEALTH

- **Health of people who consume:** The harmful pesticides and herbicides that pollute the soil by making it toxic also contaminate the crops that grow on it. As the soil particles absorb the harmful chemicals and get accumulated, the roots of the crops absorb them and make the food crops unfit for consumption. Consequently these harmful chemicals get access to human biological system causing various diseases.
- **Health of farmers:** Farmers are mostly exposed to these chemicals and certain types of cancer prevail among the farmers due to this exposure. Leukemia (cancer of WBC), Multiple Myeloma (cancer of plasma cells in bone marrow, cancer of skin, prostrate, stomach, lips, brain are common among them. In fact their family members are not free from the risk of having such cancers too. People who reside near agricultural fields are also prone to cancer as the air is also get polluted by the chemical pesticides and fertilizers used in farming.

AGRICULTURAL SUSTAINABILITY

There are various ways that should be adopted to get rid of this pollution. Different strategies of waste management can be explored. Research teams can be set up to identify the problem of the particular place, the types of toxic waste that is accumulated after farming and to find a

way to re-cycle them so that some beneficiary output can be derived. For example in Indonesia, Cassava is the most important crop and its pulp waste is recycled to be used as super-absorbent. Another way is pest management. Experiments and researches are being conducted to find the ways of pest management. Another way is to switch to organic farming. In this paper the focus is on organic farming.

ORGANIC FARMING

As it is already been observed that most of the pollutions are occurring due to use of harmful factory made chemical fertilizers and pesticides, organic farming is a solution to this problem. Organic farming does not involve any chemical products. Locally made recycled manures are used in place of fertilizers. As per FAO, organic agriculture is “A unique production management system which promotes and enhances agro ecosystem, health, including biodiversity, biological cycles and soil biological activity, which is accompanied by using on farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs”. Organic farming aim towards a healthy atmosphere for crops to yield. Also it helps to keep health of soil in check. It is also a protector from various health hazards including cancer. It helps to improve the aquatic ecosystem as well. As agriculture contributes to air pollution, organic farming helps in improving the air quality.

WAYS TO DO ORGANIC FARMING

There are various ways of production of organic food products. That includes use of compost, manure, green manure, animal feces and urine, together called Excreta. Different techniques such as crop rotation and companion planting are implemented. Biological pest control, mixed cropping and the fostering of insect predators are also included in this process. In general, organic standards are designed to allow the use of naturally occurring substances while prohibiting or strictly limiting synthetic substances. One such kind of farming prevailing in very few states of India is Agnihotra Farming. Few examples of organic product attained after applying Agnihotra farming are pulses, lentils, Chana daal, masoor daal, grapes, various vegetables like cauliflower, groundnuts, turmeric, wheat, tomato, cucumber, garlic, ginger etc. and positive results had been attained. In this kind of farming cow dung, cow's urine is used along with ash and water to make a solution which provides as manure to the soil.

RESEARCH METHODOLOGY

Primary data had been collected from different locations of Bengaluru by means of structured questionnaire. The sample size is 120. Convenient sampling has been conducted.

Bengaluru is a metropolitan city that comprises of people from different cultures, religions, castes, languages, occupations, income groups and different food preferences as it has many educational and financial institutes. It is IT hub of India and is called Silicon Valley of India. It also has several organic food outlets along with potential buyers who can afford organic food which is little more expensive than regular food. It has been found that demand for organic food products is increasing in this cosmopolitan city. Bengaluru is organic hub of India and has the highest sales of organic food product as well as the largest number of organic outlets growing at the rate of 35-40% per year. So Bengaluru is selected as the field of investigation for the analysis.

STATISTICAL TOOLS USED

- Microsoft Excel for the graphs and charts
- R for statistical tests, charts and calculations

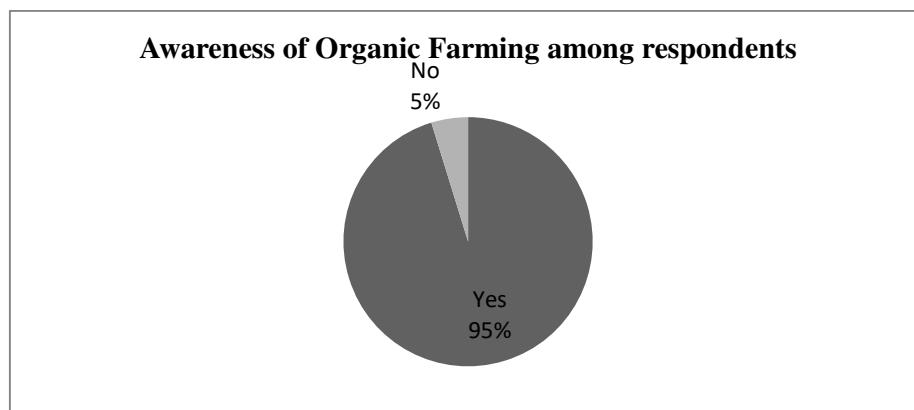
STATISTICAL TECHNIQUES USED

- Chi-square test.

ANALYSIS AND FINDINGS

When the percentage of awareness of organic farming was calculated from the data, it was found to be very high. Almost 95% of the respondents had knowledge about organic farming in India irrespective of all the demographic factors as well as other factors.

Fig 1: Awareness of organic farming



Source: Primary data

Now the demographic factors like age, sex, number of family members, marital status and educational qualification are considered. Since the data collection is done in Bangalore and there are many people staying in Bangalore are from different states and cities of India for job and education purposes, so another factor has been considered. That factor is defined as native and hence got two outcomes viz. Bangalore and outside.

A chi-square test is conducted to find out whether the awareness of organic farming is independent of the demographic factors considered in the study or not and hence the following hypotheses are considered.

H_{01} : Awareness is independent of age-groups H_{11} : it is not independent.

H_{02} : Awareness is independent of sex H_{12} : it is not independent.

H_{03} : Awareness is independent of education H_{13} : it is not independent.

H_{04} : Awareness is independent of marital status H_{14} : it is not independent.

H_{05} : Awareness is independent of native location H_{15} : it is not independent.

The following result was obtained.

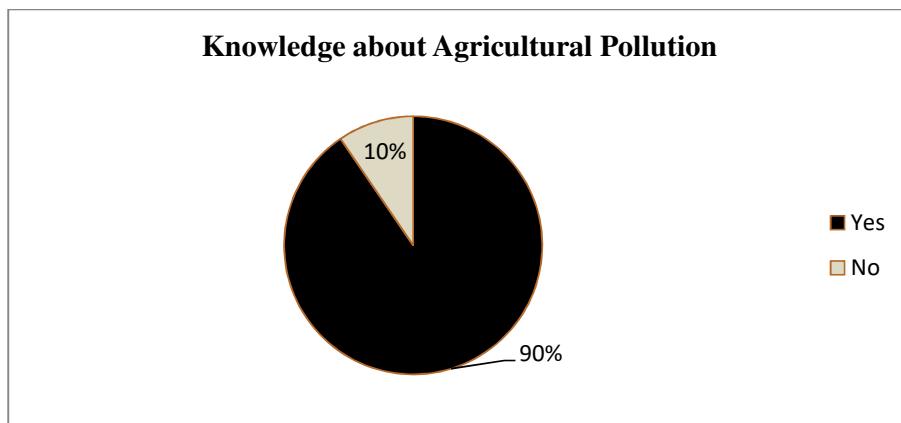
Table 1: Chi-square test for different demographic factors.

Demographic Factors	Chi-square value	D.F.	P-value	Comparison	Decision
Age	2.71	6	0.846	> 0.05	Accept
Sex	4.90×10^{-30}	1	0.91	> 0.05	Accept
Education	2.85	3	0.418	> 0.05	Accept
Marital Status	1.8×10^{-30}	1	0.956	> 0.05	Accept
Place	3.1×10^{-31}	1	0.923	> 0.05	Accept

It is found that the awareness about organic farming is independent of all the demographic factors. This implies that knowledge about organic farming does not depend on how educated or how old a person is, also not on the fact whether the person is male or female, married or single or whether the person is originally from Bangalore or not.

When people were asked about their knowledge of agricultural pollution, they were not quite used to the term, when explained to them, the following outcome was obtained.

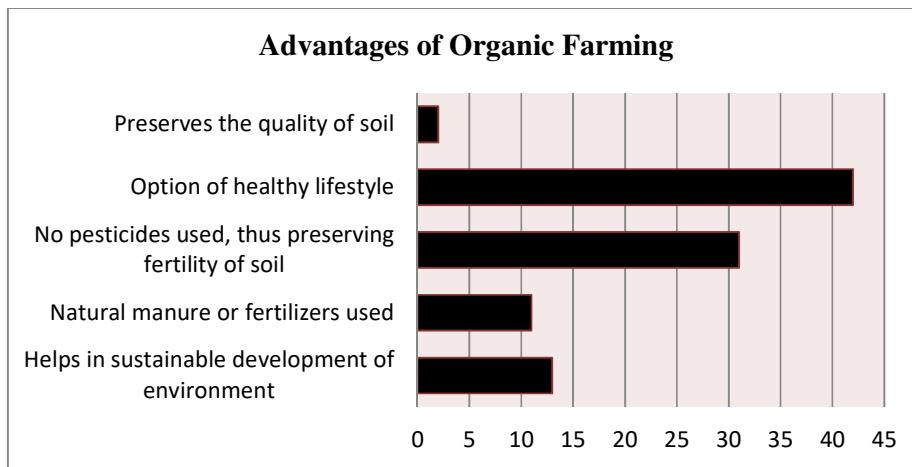
Fig. 2: Pie Chart showing percentage of people knowing about agricultural pollution



Source: Primary Data.

When people were asked about the advantages most of them said it is a great option of a healthy lifestyle. This is really important in today's busy life. Also people are aware that pesticides are not used in such kind of farming, so it is less harmful and toxic. Some people are also aware about the sustainable development of the environment as organic farming reduces environmental pollution which include water, air and soil.

Fig 3: Advantages of organic food

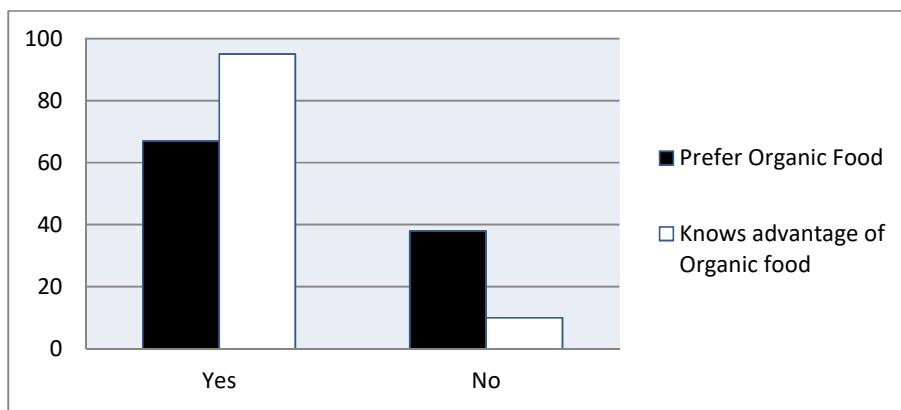


Source: Primary Data

91% of the respondents are aware of advantages of organic farming. Among them 66.33% of prefer organic food while 33.67% do not. On the other hand, 40% of those who do not have

knowledge about organic farming, prefer organic food and 60% do not prefer. A chi-square test of independence is performed between these two factors. The hypothesis is stated as H_0 : Knowledge about advantage of organic food and preference are independent against the alternative hypothesis H_1 : They are not independent. The p-value < 0.05 suggests that having knowledge and preferring organic food are not independent of each other.

Fig 4: Number of people having knowledge about organic food and preferring it



Source: Primary Data

CONCLUSION

Agricultural pollution is a menace in today's society. While we cannot imagine a world without agriculture, on the other hand it is polluting nature in various ways. Organic farming is definitely a way out as it does not involve use of chemical pesticides and fertilizers. All the pollution and health problems arise mainly due to use of these products. People are more or less aware about the organic farming and its advantages but when a portion of the population still prefers non-organic food. More initiative should be taken from government to make people aware and encourage them to consume organic food. Also, aids should be provided to farmers so that they can switch to organic farming. They should be made aware of the fact that regular agriculture can bring disease like cancer to them and to their families.

REFERENCES

- Abhang P., Patil M. and Moghe P. (2015). "Beneficial Effects of Agnihotra on Environment And agriculture", (Book) 5(2).
- Atafar Z, Mesdaghinia A, Nouri J, Homae M, Yunesian M, Ahmadimoghaddam M, Mahvi AH

- (2010). “Effect of Fertilizer Application on Soil Heavy Metal Concentration” Environ Monit Assess.160.83–89
- Brijesh Sivathanu. (2015). “Factors affecting Consumer Preference towards the Organic Food Purchases”, Indian Journal of Science and Technology, Vol 8(33), 1-6.
- Dr.Akankshya Patnaik. (2018). “Consumers Perception towards Organic Food: A Study”, JETIR, 5(6), 309-313.
- Gauthami H.S. (2008.) “Market Research on Organic Agricultural Produce in Bangalore City”, Department of Food and Nutrition, University of Agricultural Science,1-95.
- Gul A. (2014). “Agricultural Pollution- An Emerging Issue”. Improvement of Crops in the Era of Climatic Changes. 1, 347-387. DOI: 10.1007/978-1-4614-8830-9_13.
- Jagannath D. (2008). “Prospects of Organic Farming in India”, Journal of Global Communication, 1(2), 181-193.
- Konda Kalyani. (2017). “Consumer Perception towards Organic Food Products in India”, IJIRT, 4(7), 1-5.
- Kongshaug G (1998) “Energy Consumption and Greenhouse Gas Emissions in Fertilizer Production”. IFA Technical Conference, Marrakech, Morocco, 18
- M.Shireehsa, Prof.V.Chandra Sekhar Rao. (2018). “A Study on Urban Consumer Perception towards Organic Food Products”, IOSR Journal of Business and Management (IOSR-JBM), 20(6)(III.), 18-23.
- Mishra R. (2009). “Scientific Role of Agnihotra in Organic Farming”, 1st Edition, Shri Madhavswami Paryavarjan Sanrakshan Samiti, 15-30.
- Nayana Sharma, Dr. Ritu Singhvi. (2018). “CONSUMES PERCEPITION AND BEHAVITHE TOWARDS ORGANIC FOOD:A SYSTEMATIC REVIEW OF LITERATURE”, Journal of Pharmacognosy and Phytochemistry, 7(2), 2152-2155.
- Potdar J. (1988). “Agnihotra Krishi” (Book).
- Priya Soni. (2015). “Indian Consumer’s Adoption of a Green Innovation and Social Identity-The Case of Organic Food.” Journal of commerce, economics & computer science, 1(4), 1-23.
- S. Suganya, Dr. S. Aravindh. (2014). “Analysis of Consumers’s Prefrence towards Organic Food Products Based on Product Price”, Journal of Business Management & Social Sciences Research, 3(12), 73-76.

- Savci S (2012) “An Agricultural Pollutant: Chemical Fertilizer”. Int J Environ Sci Dev 3:77–80
- Sofia P.K., Prasad R. and Vijay V.K. (2006). “Organic Farming-Tradition Reinvented”, Indian journal of traditional knowledge,5(1), 139-142.
- Soumya.K.M. (2015). “Organic Farming: An Effective Way to Promote Sustainable Development in India”, IOSR Journal Of Humanities and Social Science(IOSR-JHSS), 20(6), 31-36.
- Wang W, Li XH, Lu H (2008) “Residual and Potential Risk of Organochlorine Pesticides in Urban Soils of Yinchuan”. J Wenzhou University (Nat Sci) 29:32–37

USING SATELLITE TO IMPROVING AN INDIAN AGRICULTURE ECONOMY

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ABSTRACT

Agriculture is an important part of India's economy and at present it is among the top two farm producers in the world. This sector provides approximately 50 percent of the total number of jobs available in India and contributes around 18.1 percent to the GDP. Agriculture is the only source of living for almost two-thirds of the employed class in India. As being stated by the economic data of financial year 2019-20, agriculture has acquired 6.2 per cent India's GDP. The agriculture sector of India has occupied almost 43percent of India's geographical area. Here i propose how we can use satellite source to improve our Indian agriculture Economy.

Keywords: GDP, Agriculture Sector.

INTRODUCTION

Agriculture plays a vital role in the Indian economy. Over 70 per cent of the rural households depend on agriculture.to using the satellite we can avoid unwanted expenses of money and time, work. Now days our India changes into digital world to improving technology in many fields. Here I suggested if we use of satellite in Agriculture it can impure our Indian economy in this Agriculture field. A satellite is an object with mass which revolves around the another object which is heavier than that. For instance Moon is a Natural Satellite to Earth because it revolves or moves around the Earth. The Satellites which are man-made are known as Artificial Satellite. For example: sputnik 1, Rohini

OBJECTIVES OF THE STUDY.

1. To know about Satellite, Types of satellite and Remote Sensing of Agriculture
2. To know about Earth observation satellites (EOS)
3. To provide Conclusion based on the study

SATELLITE

A satellite is an object with mass which revolves around another object which is heavier than that. For instance Moon is a Natural Satellite to Earth because it revolves or moves around the Earth [4]. The Satellites which are man-made are known as Artificial Satellite. Two Stations on Earth want to communicate through radio broadcast but are too far away to use conventional means. The two stations can use a satellite as a relay station for their communication. One **Earth Station** sends a transmission to the satellite. This is called a **Uplink**. The satellite **Transponder** converts the signal and sends it down to the second earth station. This is called a **Downlink**.

BASICS: ADVANTAGES OF SATELLITES

The advantages of satellite communication over terrestrial communication are:

- The coverage area of a satellite greatly exceeds that of a terrestrial system.
- Transmission cost of a satellite is independent of the distance from the center of the coverage area.
- Satellite to Satellite communication is very precise.
- Higher Bandwidths are available for use.

HOW SATELLITES ARE USED IN SERVICE TYPES

- Fixed Service Satellites (FSS)
 - ✓ Example: Point to Point Communication
- Broadcast Service Satellites (BSS)
 - ✓ Example: Satellite Television/Radio
 - ✓ Also called Direct Broadcast Service (DBS).
- Mobile Service Satellites (MSS)
 - ✓ Example: Satellite Phones

TYPES OF SATELLITE

➤ Satellite Orbits

- 2.11 Geostationary Earth Orbit [GEO]
- 2.12 Low Earth Orbit [LEO]
- 2.13 Medium Earth Orbit [MEO]
- 2.14 Molniya Orbit
- 2.15 HAPs

GEOSTATIONARY EARTH ORBIT (GEO)

These satellites are in orbit 35,863 km above the earth's surface along the equator. Objects in Geostationary orbit revolve around the earth at the same speed as the earth rotates. [5] This means GEO satellites remain in the same position relative to the surface of earth.

LOW EARTH ORBIT (LEO)

LEO satellites are much closer to the earth than GEO satellites, ranging from 500 to 1,500 km above the surface. LEO satellites don't stay in fixed position relative to the surface, [4] and are only visible for 15 to 20 minutes each pass. A network of LEO satellites is necessary for LEO satellites to be useful.

MEDIUM EARTH ORBIT (MEO)

A MEO satellite is in orbit somewhere between 8,000 km and 18,000 km above the earth's surface. MEO satellites are similar to LEO satellites in functionality. MEO satellites are visible for much longer periods of time than LEO satellites, usually between 2 to 8 hours. MEO satellites have a larger coverage area than LEO satellites.

MOLNIYA ORBIT SATELLITES

Used by Russia for decades. Molniya Orbit is an elliptical orbit. The satellite remains in a nearly fixed position relative to earth for eight hours. A series of three Molniya satellites can act like a GEO satellite. Useful in near Polar Regions

HIGH ALTITUDE PLATFORM (HAP)

High Altitude Platform (HAP) is one of the newest ideas in satellite communication. A blimp or plane around 20 km above the earth's surface is used as a satellite. HAPs would have very small coverage area, but would have a comparatively strong signal. Cheaper to put in position, but would require a lot of them in a network.

REMOTE SENSING OF AGRICULTURE

Many remote sensing applications are devoted to the agricultural sector. Representative case studies are presented in the special issue "Advances in Remote Sensing of Agriculture". Here the selected application is discuss a remote sensing using in satellite application is "**Assessment of crop phenological development**". [6] The phenological

dynamics of terrestrial ecosystems reflect the response of the Earth's biosphere to inter- and intra-annual dynamics of the Earth's climate and hydrologic regimes. Remotely sensed satellite data possess significant potential for monitoring vegetation dynamics, due to their synoptic coverage and frequent temporal sampling. This enables the monitoring of simple phenological events, such as the start and peak of vegetation growth, both in natural ecosystems and in agricultural landscapes. In this Crop phenological development here review for Brazil and Australia phenological indicators .

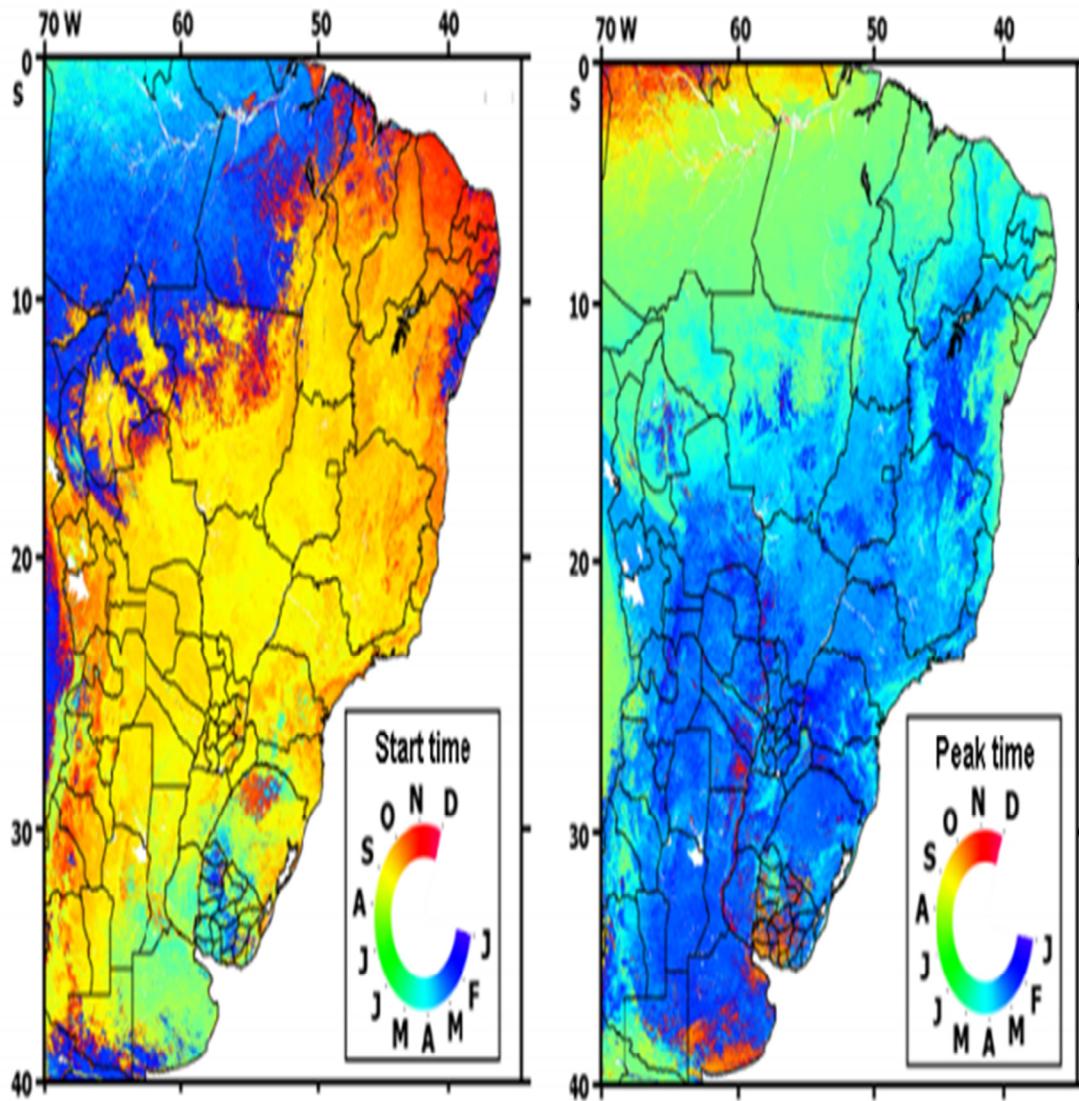
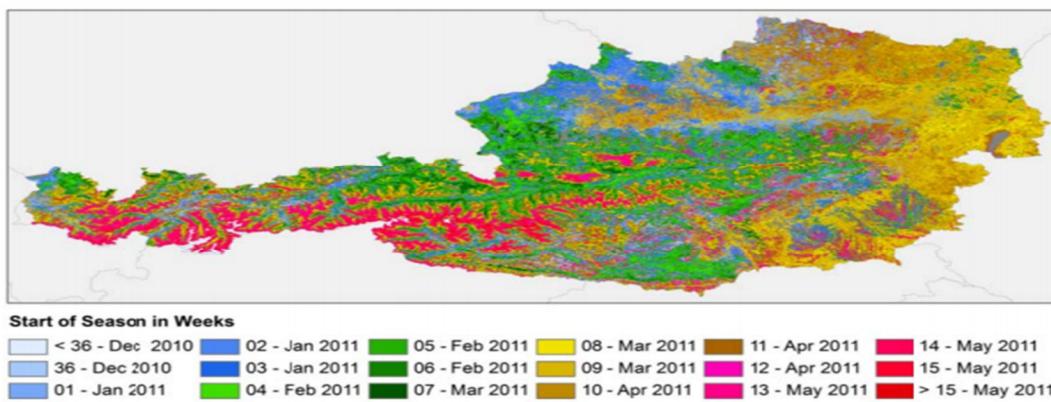


Figure 1

Above figure 1 shows satellite-derived phenological indicators: average start of season (SOS) and peak of season (POS) in Brazil.

**Figure 2**

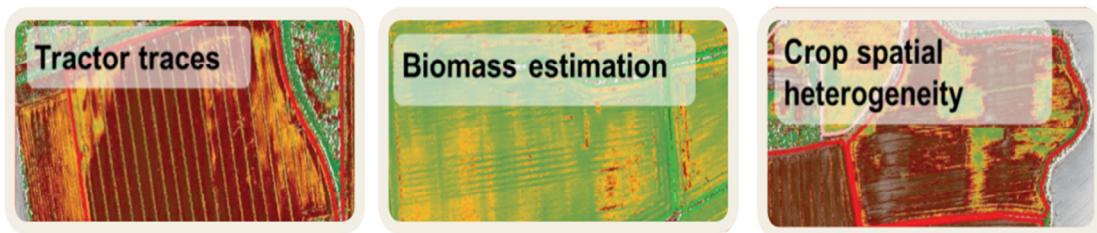
The above figure2 shows moderate Resolution image spectroradiometer (MODIS) derived starts of season (SOS) in 2011 in Austria.

In this **Assessment of crop phenological development** approach modeling the entire time series . A fitted curve simplifies the parameterization necessary for identification of metrics, such as start of season. In addition, data gaps are easily handled. using this method in our Indian agriculture people remotely work and access the data so the time and unexpected losses will be reduced.

EARTH OBSERVATION SATELLITES (EOS)

EOS sensors provide measurements of crop reflectance and structure that can be related to biophysical properties, such as LAI, height, yield and growth stage (Figure 3). However, it is important to note that EOS rarely provides direct measurements of these biophysical properties; instead, it is common to exploit [7] EOS data within a data science approach and use crop models to link EO measurements to crop dynamics of interest (Figure 4) Yield prediction is a major area of interest within agriculture and numerous models have been developed for crops including wheat, maize, sugar beet and potatoes. Typically, a series of direct ground measurements of the crop are recorded throughout the year, such as tiller number, leaf area index, and crop height, weed infestation, and are used to monitor production. Yield is then usually forecast using regression against previously measured yield data. Key parameters that can be estimated from EO are increasingly incorporated into yield models, for example weed infestations from high spatial resolution data or vegetation indices used to infer LAI. The main advantage of EO in this context is the ability to rapidly assess parameters over far larger spatial areas than can be recorded on the ground. EO data can also

be incorporated with more complicated numerical crop models that use agro-meteorological parameters (eg temperature, rainfall, radiation, crop type, soil type, nutrient availability) to estimate crop biomass, health and yield. EO data can be directly fed into these models, providing spatial and temporal data necessary to update the model during the season and improve predictions. These systems can operate at local scales, such as Fruitlook (www.fruitlook.co.za), which is a pre-operational service offering South African grape and deciduous tree grower's weekly estimates of eight crop parameters to inform them on crop growth, water use and nutrient status, together with a forecast of soil moisture content. Fruitlook obtains its estimates by directly feeding EO data into energy and water balance algorithms.



**Figure 3 Example measures derivable through assessment of EO data
(Imagery Source – Planet)**

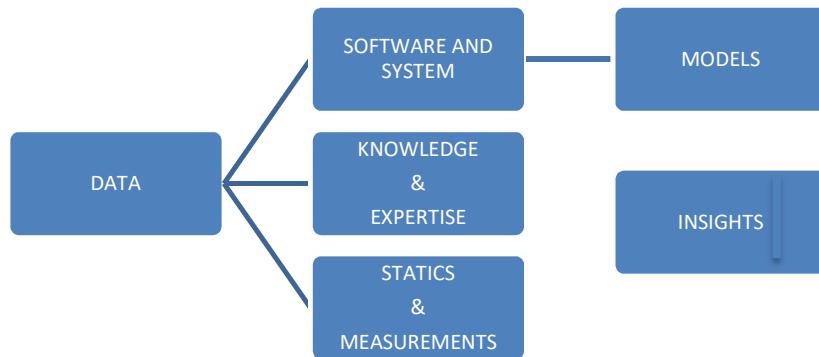


Figure 4 System integration required to turn data into knowledge

CONCLUSION

Agriculture plays a vital role in the Indian economy. Over 70 per cent of the rural households depend on agriculture. Using the satellite we can avoid unwanted expenses of money and time, work. Now days our India changes into digital world to improving technology in many fields. Here I suggested if we use of satellite in Agriculture it can impure our Indian economy in this Agriculture field to using of Remote Sensing of Agriculture and Earth observation satellites (EOS) methods.

REFERENCES

- www.economictimes.indiatimes.com/articleshow/70559255.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
- An Analysis of Agriculture Sector in Indian Economy Himani Assistant Professor in Economics, Guru Nanak Khalsa College Yamuna Nagar, Haryana
- An Introduction to Agricultural Social - Subhash Chandra, New Visha.
- NASA's Soil Moisture Active Passive (SMAP) satellite, collecting global soil moisture data.
- Group on Earth Observations (GEO). Global Agricultural Monitoring System of Systems; TaskAG-07-03a Available(online:http://www.earthobservation.org/crop_ag_gams.shtml (accessed on 18 February 2013))
- <https://www.nasa.gov/offices/oct/home/roadmaps/index.html>
- <http://invest-space.eu/wp-content/uploads/2016/03/ESA-Technology-roadmap-2013-presentation.pdf>

STATUS OF AGRICULTURE IN INDIA – AN OVERVIEW

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ABSTRACT

Agriculture is considered as the back bone of our country. The food we eat is all from agriculture, without this work happening in the world we people cannot survive. Agriculture is one of the top most occupations done in INDIA. Agriculture is compared to ancient days to present days. Agriculture in ancient days without any chemicals and other products which reduces the yield of the crop. Agriculture is the main occupation of each and every person when compared to now. Now it is drastically changes life and as well as occupations. In olden days they plough the field with bulls. They use ancient methods to do the agriculture in order to improve the yield of the crop. But now they use the occupation as a trading. They use chemicals for agriculture which leads to wastage of food. They even now polish the rice of each grain of rice. This leads to useless. This is the main reason people die fastly, people also stronger than now because how people eat earlier compare to now. Now-a-days the work agriculture is not taking place properly because of the usage of agricultural land for various purposes and not putting interest in agriculture. Also the people who are under agriculture are not getting good results from their fields due to increase in pollution. These people are also not getting good income from the work; so many people are leaving this work. To increment the yield from agriculture government should come with some plans and implement them for the welfare of the people of our country. They should not only implement plans, but also should check whether it is taking place correctly or not. And they should also check whether it is handy to the people or not. So, finally by taking some measures and providing some subsidies the agricultural system now days will get implemented and all the people of the country will have sufficient amount of food produced from agriculture to eat.

Keywords: Agriculture, India, Agricultural Land, Government, Welfare Measures.

INTRODUCTION

Agriculture plays a vital role in the Indian economy. Most of the people in our India depending upon the agriculture and we can say that Indian economy is developing because of the agriculture. From agriculture we get food, furniture and many house hold things. It is our country basic need. India stood first in the growth of the agriculture. Agriculture, along with fisheries and forestry, is one of the largest contributors to the gross domestic product. These days our agriculture is increasing because of increasing technology. In ancient days, agriculture do not have that much priority. But, now a day without agriculture there is no life. No, human being can survive without agriculture. But, now a day the people are spoiling the agriculture a lot. They are killing the lands by sprays, pesticides, fungicides, some useless products, etc... Agriculture is one of the backbone of the entire human as well as Animals. Present situation of agriculture is very worst. In ancient days maximum people depends on agriculture because agriculture is only one way to generate the money. As per my point of views agriculture is very important for us. Because maximum people depend on agriculture without agriculture we can't leave more, that the region it is important. Finally in this era there are lots of facilities for agriculture but people do not focus on it. They all are waste the land for making the Mole as well as making of lots of things. In current situations agriculture development is not improved and lot of new technologies which helpful for betterment of fields. Even though there may availability of new technologies but we do not have much land to increase agriculture productivity, in current days. No inventions are there in ancient days to develop. In ancient days, only man power required for developing fields and much land for fields. Due to this farmers don not get more loss in ancient days by agriculture. It's not like ancient days, now a days because, increase in population leads to decreasing the usage of soil for agriculture, and drastic climate changes are also one big reason. Results in decreasing the percentage of fields for agriculture land, which leads to more loss for farmers in current days. Increase in population leads to increase pollution in world which decreases the soil content. Moreover, people addicted to artificial food and fast food and forgot to eat healthy food which leads to decrease the growth of human life. As per 2018, agriculture employed 50% of the Indian work force and contributed 17-18% to country's GDP. In 2016, agriculture and allied sectors like animal husbandry, forestry and fisheries accounted for 15.4% of the GDP (gross domestic product) with about 31% of the workforce in 2014.

STATEMENT OF THE PROBLEM

Agriculture plays a crucial role in the life of an economy. It is the backbone of our economic system. Agriculture not only provides food and raw material but also employment opportunities to a very large proportion of population. Indian agriculture began by 9000 BCE as a result of early cultivation of plants, and domestication of crops and animals. Settled life soon followed with implements and techniques being developed for agriculture. Double monsoons led to two harvests being reaped in one year. India is an agriculture based country, where more than 50% of population is depend on agriculture. This structures the main source of income. The commitment of agribusiness in the national income in India is all the more, subsequently, it is said that agriculture in India is a backbone for Indian Economy. India is an agricultural country. Agriculture sector plays an important role in Indian economy. Most of the people earning depends on agriculture. Agriculture is the one which gives food, medicine, furniture and many more things. Present situation is becoming worst day by day when compared with ancient days. In ancient days, people live very simple life without any electronics gadget, mobile phones. Due to less population in ancient time, Earth is greener than today. Farmer able to grow their crops properly without any chemical effects. But now situation is something else and for that the main reason is global warming making the land polluted, river polluted. Due to which soil is losing its fertility Almost about 58% of rural house hold depends on agriculture. Compare to olden days we have lot many techniques to improve agriculture growth. Agriculture and its allied activities act as main source of livelihood for more than 80% population of rural India. It provides employment to approximately 52% of labour. Its contribution to Gross Domestic product (GDP) is between 14 to 15%. India ranks 74 out of 113 major countries in terms of food security index. India's agricultural economy is undergoing structural changes. As per 2018, agriculture employed 50% of the Indian work force and contributed 17-18% to country's GDP.

OBJECTIVE

The following are the objectives of this study:

- To create the importance of agriculture in our country.
- To trace the overview of agriculture and its allied sectors.
- To study the demand of agricultural commodities and its emerging trend.

METHODOLOGY

The present study is theoretical and conceptual in nature in the field of Agriculture with strong and sufficient background of secondary data. The secondary was collected from State of Indian Agriculture and Pocket book of Agricultural Statistics, Government of India, Ministry of Agriculture & Farmers Welfare, Department of Agriculture, Cooperation & Farmers Welfare, Directorate of Economics & Statistics, New Delhi.

OVERVIEW OF AGRICULTURE AND ITS ALLIED SECTORS

Gross Value Added in Agriculture

Agriculture sector in India typically goes through cyclical movement in terms of its growth.

Table 1: Growth of GVA in Agriculture and Allied Sources

Item	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19**
Total GVA at basic prices	5.4	6.1	7.2	8.0	7.9	6.9	6.6
Agriculture, Forestry and Fishing	1.5	5.6	-0.2	0.6	6.3	5.0	2.9
Crops	0.2	5.4	-3.7	-2.9	5.0	3.8	---
Livestock	5.2	5.6	7.4	7.5	9.9	7.0	---
Forestry and Logging	0.2	5.9	1.9	1.7	1.4	2.1	---
Fishing and Aquaculture	4.9	7.2	7.5	9.7	10.0	11.9	----

Source: Computed Data (MOSPI)

**As per the press note on Provisional Estimates of Annual National Income 2018-19 and Quarterly Estimates of Gross Domestic Product for the Fourth Quarter (Q4) of 2018-19 released by CSO on 31st May 2019

RANKING OF STATES BASED ON AMFFRI

No state in the country has implemented the entire set of market reforms. Also, land leasing and harvest and marketing of some tree species on private farm land are subjected to various degrees of restrictions in almost all the states and union territories. Maharashtra achieved first rank in NITI Aayog launched "Agricultural Marketing and Farmer Friendly Reforms Index (AMFFRI), which ranks states based on the degree of reforms they have undertaken in agricultural marketing." The State has implemented most of the marketing reforms and it offers best environment for doing agri-business among all the States/UTs. Gujarat ranks second with a score of 71.5 out of 100, closely followed by Rajasthan and Madhya Pradesh," the Economic Survey 2018-19 highlighted. Agriculturally developed State of Punjab ranks 14th with a score of 43.9. This is because of poor implementation of market reforms in the state. Almost two third States/UTs could not reach even halfway mark of reforms score. Major states like U.P., Punjab, West Bengal, Assam, Jharkhand, Tamilnadu and J&K are in this group. It is also pertinent to mention that some States/UTs do not have APMC Act. It is challenge to provide ranking to these states in market reforms.

INDIA'S FOOD SECURITY SCORE, 2018

The Global Food Security Index (GFSI), 2018 considered four core issues of food security across 113 countries. The GFSI ranks countries on a score of 0-100 based on the first three categories while natural resources and resilience is used as an adjustment factor. A rank of 100 is considered most favorable. GFSI's major goal is to assess in a timely manner which countries are most and least vulnerable to food insecurity.

Category	India (Score)	Score of all Countries (Average)	India's Rank out of 113 Countries
OVERALL	50.1	58.4	76
Affordability	46.4	56.3	73
Availability	54.1	60.3	70
Quality and Safety	48.2	58.2	79

Source: Computed Data (GFSI, 2018)

DEMAND OF AGRICULTURAL COMMODITIES

Item	Achieved TE 1997-99			Demand in 2020 (million tons)		Yield target in 2020	
	Area (Million ha)	Production (Million tons)	Yield (Kg/ha)	LIG	HIG	LIG	HIG
Rice	42.2	85.7	1903	112.4	111.9	2664	2652
Wheat	26.2	69.1	2582	82.3	79.9	3137	3045
Coarse Cereal	30.7	30.4	1041	38.9	37.3	1268	1214
Cereal	99.1	185.2	1814	233.6	229.0	2357	2311
Pulses	21.7	13.8	605	22.3	23.8	1029	1095
Food Grains	120.8	199.0	1595	255.9	252.8	2119	2092
Edible Oil	28.6	6.4	269	10.8	11.4	379.7	399
Potato	1.2	21.6	17188	27.8	30.6	22279	24566
Vegetables	5.3	74.5	14204	135.6	168.0	25673	31812
Fruits	3.2	43.0	13437	77.0	93.6	24064	29259
Sugarcane	3.7	26.9	7006	32.6	33.7	8788	9088
Gur							
Milk	-----	71.2	-----	115.8	137.3	-----	-----
Meat	-----	5.0	-----	8.8	11.4	-----	-----
Eggs	-----	2873	-----	7750	10,000	-----	-----
Fish	-----	5.3	-----	10.1	12.8	-----	-----

Source: R.S.Paroda and Praduman Kumar (2000). Food Production and Demand in South Asia. Agril. Econ. Res. Rev. 13(1):1-24. LIG: Low income growth 3.5% per capita

GDP growth, HIG: High income growth 5.5% per capita GDP growth, Demand includes export 4.7mt rice, 3.6 mt wheat, and vegetables 2.2 mt fruits 1.4mt, and fish 0.49 mt.

EMERGING TREND

The agriculture sector recorded satisfactory growth due to improved technology, irrigation, inputs and pricing policies. Livestock, poultry, fisheries and horticulture are surging ahead in production growth in recent years and will have greater demand in the future. Industrial and service sectors have expanded faster than agriculture sector resulting in declining share of agriculture in national accounts. Despite the structural change, agriculture still remains a key sector, providing both employment and livelihood opportunities to more than 70 percent of the country's population who live in rural areas. The contribution of small farmers to the national and household food security has been steadily increasing. The water availability for agricultural uses has reached a critical level and deserves urgent attention of all concerned. India has high population pressure on land and other resources to meet its food and development needs. The natural resource base of land, water and bio-diversity is under severe pressure. Food demand challenges ahead are formidable considering the non-availability of favorable factors of past growth, fast declining factor productivity in major cropping systems and rapidly shrinking resource base. Vast uncommon opportunities to harness agricultural potential still remain, which can be tapped to achieve future targets. There are serious gaps both in yield potential and technology transfer as the national average yields of most of the commodities are low, which if addressed properly could be harnessed. Concentration was on enhanced production of a few commodities like rice and wheat, which could quickly contribute to increased total food and agricultural production. This resulted in considerable depletion of natural resources and the rainfed, dry areas having maximum concentration of resource poor farmers remained ignored, aggravating problems of inequity and regional imbalances. This also led to a high concentration of malnourished people in these rain fed, low productive areas. This era also witnessed rapid loss of soil nutrients, agro-biodiversity including indigenous land races and breeds. The agriculture policy must accelerate all-round development and economic viability of agriculture in comprehensive terms. Farmers must be provided the necessary support, encouragement and incentives. It must focus both on income and greater on-farm and off-farm job and livelihood opportunities.

SUGGESTIONS AND CONCLUSION

Agriculture stands for world's largest economy. The agriculture situation in India is in worst condition. The people when they become educated are not even looking at their farms back. These agriculturists are not getting sufficient amount of money for what they are doing. The rich is becoming richer and the poor is becoming poorer. They are not even ready or have wealth to educate their children in high standards. Earlier in ancient days they require more men for agriculture but now we need less man power. Agriculturist believes in fact that "Hard work pays". There are lot many technologies to improve the agriculture growth. Due to these high techniques we can also preserve wheat and other food grains. . In India, many farmer suicides due to loss in farming sector which can any reason like shortage of rainfall or soil erosion related issues. This situation occurs only due to humans. Nowadays everyone is having two or three vehicles, electronic gadget and lot more. And due to this excess usage of electronics devices we are affecting global warming. Cutting forest so that we can build big shopping malls, houses. No one thing to plant tree in their house. In national priority setting, the following recurring and emerging issues for sustainable agricultural development and poverty alleviation must be considered: Population pressure and demographic transition; Resource base degradation and water scarcity; Investment in agriculture, structural adjustment and impact on the poor; Globalization and implication on the poor; Modern science and technology and support to research and technology development; and Rapid urbanization and urbanization of poverty, and deceleration in rural poverty reduction.

In addressing the above issues, a policy statement on agriculture must take note of the following uncommon opportunities: Conservation of natural resources and protection of environment, Vast untapped potential of our soil and water resources, and farming systems, Technology revolution especially in the areas of molecular biology, biotechnology, space technology, ecology and management, Revolution in informatics and communication and the opportunity of linking farmers, extension workers and scientists with the national and international databases. So to save agriculture and make agriculture sector better than ancient period, we have to plant more and more trees and cause less pollution, less radiation from electronics device.

REFERENCE

- <http://www.yourarticlrary.com/agriculture/10-major-agricultural-problems-of-india-and-their-possible-solutions/20988>
- https://en.m.wikipedia.org/wiki/Agriculture_in_India
- <http://www.walkthroughindia.com/offbeat/10-largest-agricultural-producing-states-of-india/>

STATUS, DIFFICULTIES AND IT'S WORKING IN INDIAN ECONOMY UNDER AGRICULTURAL DIVISION

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ABSTRACT

Agribusiness is a significant piece of India's economy and at present it is among the best two homestead makers on the planet. This segment gives roughly 52 percent of the all out number of occupations accessible in India and contributes around 18.1 percent to the Gross domestic product. Agribusiness is the main methods for living for very nearly 66% of the utilized class in India. As being expressed by the monetary information of money related year 2006-07, agribusiness has gained 18 percent of India's Gross domestic product. The horticulture division of India has involved practically 43percent of India's land territory. Horticulture area is the pillar of the Indian economy, contributing around 15 percent of national Gross Domestic product (Gross domestic product) and all the more critically, about portion of India's populace is completely or altogether reliant on farming and united exercises for their business. This paper is planned for fortifying agribusiness division in reasonable financial just as human advancement. Proficient method for generation, balanced out costs, higher pay from agribusiness would make an increasingly conjugative condition in the nation for the improvement of the economy all in all and of provincial populace specifically. Strengthening of the little and minor ranchers through instruction, changes and improvement will guarantee a superior, effective and fortified Indian farming. Inspiration new models underway and showcasing alongside making mindfulness and giving training to little ranchers will help being developed of the division and all the more significantly improving the financial status of poor ranchers. The activity intend to reinforce agribusiness in India should be on local changes through decrease of government mediation in the market economy however assuming significant job as evaluator and usage of the approaches, expanded venture and organizing the territory to contribute, parallel activity designs toward this path are required in research to build profitability and water system and water the executives.

The Indian rural part represents 13.9% of India's GDP (Gross domestic product) and utilizes only somewhat less than 54.6% of the nation's workforce. The Division of Agribusiness and Participation under the Service of Farming is the nodal association liable for the improvement of the horticulture segment in India. The reason for the investigation is to comprehend the status of Indian horticulture segment, different sorts of difficulties, and obstructions before ranchers, agro industry and governments for the advancement in agribusiness in basic wild conditions, likewise to know different Government activities, ventures, arrangements for the improvement of farming and job of agribusiness in Indian economy.

Key Words : GDP, territory, Human advancement, Rural area, Agribusiness, Gross domestic product, Ventures and Indian Economy.

INTRODUCTION

Agribusiness comprises the most critical piece of Indian Economy. It has experienced fast change in the previous two decades; the approaches of globalization and progression have opened up new roads for agrarian

modernization. This has prompted commercialization and enhancement, yet in addition activated different mechanical and institutional developments attributable to interests in segment. Agribusiness is the most significant occupation for the majority of the Indian families. Over 58% of the rustic family units rely upon agribusiness as their chief methods for occupation. Farming, alongside fisheries and ranger service, is probably the biggest supporter of the GDP (Gross domestic product). In India, horticulture contributes around sixteen percent (16%) of all out Gross domestic product and (10%) of all out fares. More than 60 % of India's territory zone is arable making it the second biggest nation as far as absolute arable land. Indian agribusiness has enrolled noteworthy development over most recent couple of decades. The nourishment grain generation has expanded from 51 million tons (MT) in 1950-51 to 250MT during 2011-12 most elevated as far back as autonomy (Kekane M. A., (2013). The farming results of critical monetary worth incorporate rice, wheat, potato, tomato, onion, mangoes, sugar-stick, beans, cotton, and so forth.



OBJECTIVES OF THE STUDY

The primary goals of the present investigation were as per the following:

- To provide a foundation of observing and assessment in agricultural sector
- To identify the present status of farming in India.
- To recognize the difficulties and job of horticulture in Indian economy.
- To interrogate the different kinds of speculation and government activities for the advancement of rural division in India.

TEST OF HYPOTHESIS

- There is no result of current agricultural status or trends which is prevailing in india.
- There is a result of recent agricultural status and analysis has been put forth for review
- There is the same strategy pursued by the agricultural division which is in a improving phase.
- There is an alternate strategy utilized by the agricultural division under Indian economy which is not in a improving phase.

RESEARCH METHODOLOGY

The optional Secondary data collection technique was utilized for information assortment. Sources of information was being gathered through Ministry of Agriculture (Economics and statistical information). During the analysis of data collection internet information and reviews have been collected.

REVIEW OF LITERATURE

According to Arun Chaturvedi, N G Patil, S N Goswami, while the per capita accessibility of farming area has been diminishing quickly wherever in India, this article calls attention to the financial ramifications of current land use and the board techniques in Uttar Pradesh. It contends that a reasonable land use approach in cooperative energy with the physical, monetary and institutional variables ought to be confined, even as venture is energized in non-agrarian division for work.

As indicated by J Challa, P K Joshi, Prabhakar Tamboli, farming instruction and Research and development in India have become overwhelmingly throughout the years however subsidizing levels have not kept pace with development in the quantity of projects, organizations, schools and colleges. Limited subsidizing and empty personnel positions are not enabling establishments to modernize the projects and foundation to make up for lost time with the changing needs of horticulture and agroprocessing. This article proposes a complete program to revive higher horticultural training.

The Author Aruna Singh, P A Lakshmi Prasanna, Ramesh Chand suggest, during the 1960s and 1970s there was an exceptional discussion on the watched backwards connection between ranch size and per hectare farming profitability in India. It was consequently contended that the higher profitability of smallholdings would vanish with the appropriation of unrivaled innovation, modernization and development all in all. In any case, near 50 years after the fact, National Example Overview information from the underlying long stretches of the 21st century show that smallholdings in Indian horticulture still display a higher profitability than huge property. These smallholdings anyway show lower per capita profitability and the rate of neediness is boundless. Techniques for Indian horticulture and smallholding family units ought to remember lessening the imbalance for land dissemination and advancing off-ranch work in the rustic zones itself. The system of improving the harvest land-man proportion by encouraging relocation from provincial India has not worked and

won't work. The lives of smallholding families can be improved uniquely by expanding on their higher per section of land agrarian profitability and by advancing off-ranch rustic business.

As suggested by A S Bhullar, R S Sidhu, Sukhpal Singh, this is a report on the first-since forever registration review led on suicides by ranchers in the two most influenced areas of Punjab, Sangrur and Bhatinda. It attempts to land at the quantity of rancher suicides, the reasons (regardless of whether they were brought about by monetary pain alone or they were because of the transaction of the powers of financial misery, social clash, social backwardness and absence of network/state support) and furthermore the present financial status of the groups of the people in question.

EXAMINATION OF INFORMATION AND INTERPRETATION OF DATA

INVESTMENTS IN FARMING SEGMENT IN INDIA

Some significant ventures and related advancements in horticulture in the ongoing past are as per the following:

Mahindra and Mahindra (M&M), India's driving tractor and utility vehicle maker, declared its entrance into beats retailing under the brand 'NuPro'. Going ahead, the organization intends to attack into e-retailing and clearance of dairy items.

Compost agreeable IFFCO propelled a joint endeavor with Japanese firm Mitsubishi Corp for assembling agrochemicals in India.

Insight, a not-for-benefit worldwide endeavor finance, has contributed Rs 11 crore (US\$ 1.7 million) in Sahayog Dairy, a coordinated substance in the portion, based at Harda locale in Madhya Pradesh.

Rabo Value Counselors, the private value arm of Netherlands-based Rabo Gathering, raised US\$ 100 million for the primary close of its subsequent store India Agri Business Store II. The reserve intends to put US\$ 15–17 million of every 10–12 organizations.

Oman India Joint Speculation Store (OIJIF), a joint endeavor (JV) between the State Bank of India (SBI) and State General Hold Reserve (SGRF), contributed Rs 95 crore (US\$ 14.62 million) in GSP Yield Science, a Gujarat-based agrochemicals organization.

The world's seventh-biggest agrochemicals firm, Israel-based ADAMA Agrochemicals plans to put in any event US\$ 50 million in India throughout the following three years.

Belgium-based Uni-veg has worked together with Mahindra and Mahindra to build up a crisp organic product store network.

Organizations from the US, Canada, Australia, Israel, the Netherlands and other European nations have demonstrated solid enthusiasm to move the accepted procedures, linkages between logical establishments, farming stockpiling, cold-chain the board, advertise access, and efficiency upgrade, for example, the presentation of new innovation in seed and plant biotech.

Canada-based Global Nourishment Security Exploration Reserve has significant interests in nourishment security investigate in a few Indian colleges. These reinforce nourishment preparing and reasonable agrarian procedures.

GOVERNMENT ACTIVITIES

A portion of the ongoing significant government activities in the horticultural segment are as per the following:

India and Lithuania have consented to heighten farming collaboration, particularly in divisions like nourishment and dairy handling.

Gujarat Government has intended to associate 26 Horticultural Produce Market Panels (APMCs) by means of electronic market stage, under the National Farming Business sector (NAM) activity.

The State Administration of Telangana plans to spend Rs 81,000 Crore (US\$ 12.1 billion) throughout the following three years to finish continuous water system ventures and furthermore embrace two new undertakings for lifting water from the Godavari and Krishna stream.

The National Dairy Advancement Board (NDDB) declared 42 dairy ventures with a money related cost of Rs 221 Crore (US\$ 34.02 million) to help milk yield and increment per creature generation of milk.

The administration wanted to contribute Rs 50,000 Crore (US\$ 7.7 billion) to restore four manure plants and set up two plants to deliver ranch supplements.

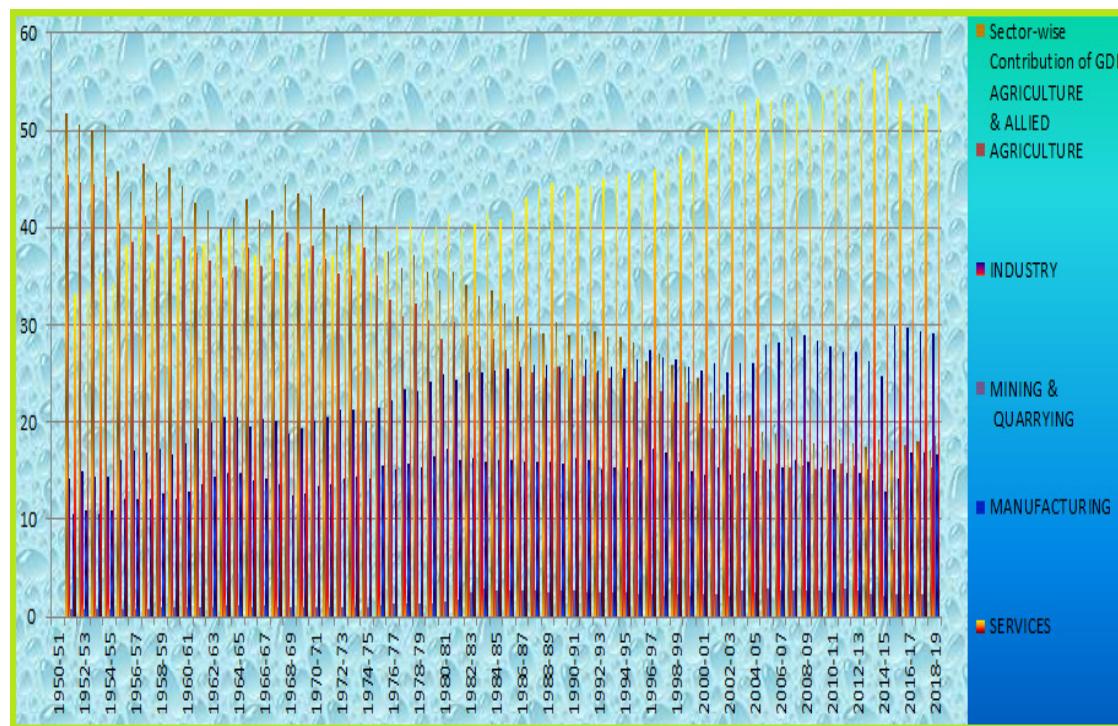
The Service of Nourishment Preparing Enterprises took some new activities to build up the nourishment handling area that would upgrade the pay of ranchers and fare of agro and handled nourishments, among others.

The Administration of Telangana designated Rs 4,250 crore (US\$ 654 million) for the primary period of the homestead credit waiver conspire. The plan is relied upon to profit 3.6 million ranchers who took advances of Rs 100,000 (~US\$ 1,539) or underneath before Walk 31, 2014. 6. Worker of outside trade.

MAJOR DIFFICULTIES

1. The horticulture area in India has experienced huge basic changes as lessening in portion of Gross domestic product from 51.81% in 1950-51 to 15.87% in 2018-19 showing a move from the customary agrarian economy towards a help commanded one (Figure 1). This abatement in farming's commitment to Gross domestic product has not been joined by a coordinating decrease in the portion of agribusiness in business. Be that as it may, inside the rustic economy, the portion of pay from non-ranch exercises has additionally expanded.

Figure 1: Sector wise commitment of Gross domestic product of India (1950-2019)



Source : statisticstimes.com/economy/sectorwise-gdp-contribution-of-india.php.

Table 1: Sector wise commitment of Gross domestic product of India (1950-2019)

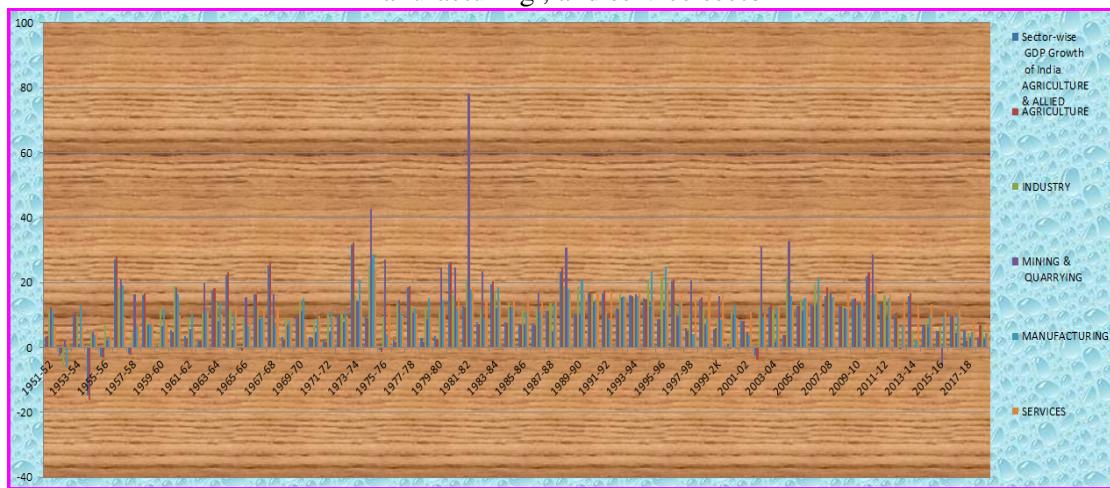
YEAR	AGRICUL TURE & ALLIED	Sector-wise Contribution of GDP				
		AGRICULTURE	INDUSTRY	MINING & QUARRYING	MANUFACTUR ING	SERVICES
1950-51	51.81	45.48	14.16	0.75	10.51	33.25
1951-52	50.67	44.56	15.00	0.79	11.04	33.59
1952-53	50.05	44.43	14.38	0.83	10.54	35.22
1953-54	50.64	45.24	14.47	0.77	10.91	34.34
1954-55	45.86	40.41	16.20	0.85	12.05	38.18
1955-56	43.77	38.43	17.06	0.86	12.19	39.78
1956-57	46.58	41.19	16.84	0.87	12.16	36.44
1957-58	44.61	39.35	17.20	0.99	12.66	38.34
1958-59	46.27	41.05	16.69	0.95	12.09	36.87
1959-60	44.26	39.09	17.76	0.96	12.89	38.04
1960-61	42.56	37.45	19.30	1.04	13.71	38.25
1961-62	41.77	36.55	19.93	1.04	14.33	38.36
1962-63	39.89	34.90	20.61	1.17	14.88	39.91
1963-64	41.08	36.10	20.54	1.11	14.85	38.47
1964-65	42.96	38.00	19.64	1.00	13.97	37.15
1965-66	40.91	35.96	20.43	1.10	14.23	38.73
1966-67	41.81	36.79	20.06	1.05	13.67	37.95
1967-68	44.53	39.43	18.78	1.04	12.43	36.16
1968-69	43.52	38.24	19.35	1.06	12.75	36.71
1969-70	43.29	38.16	20.11	1.07	13.36	36.07
1970-71	41.95	36.88	20.48	1.05	13.70	37.22
1971-72	40.28	35.25	21.23	1.03	14.29	38.37
1972-73	40.28	35.17	21.29	1.01	14.44	38.27
1973-74	43.31	37.97	20.16	0.94	14.25	35.79
1974-75	40.31	35.14	21.47	1.15	15.56	37.60
1975-76	37.62	32.59	22.19	1.37	15.24	40.05

1976-77	35.75	30.84	23.45	1.46	15.69	40.86
1977-78	37.09	32.13	23.20	1.41	15.40	39.47
1978-79	35.47	30.43	24.26	1.43	16.50	40.12
1979-80	33.63	28.55	25.02	1.64	17.31	41.33
1980-81	35.39	30.20	24.29	1.71	16.18	39.92
1981-82	34.07	28.96	25.12	2.60	16.25	40.39
1982-83	32.88	27.79	25.19	2.87	15.88	41.53
1983-84	33.54	28.58	25.22	2.75	16.10	40.81
1984-85	32.21	27.36	25.57	2.75	16.11	41.83
1985-86	30.89	26.21	25.70	2.64	15.98	43.06
1986-87	29.74	25.12	25.89	2.76	15.84	44.05
1987-88	29.18	24.64	25.92	2.55	15.87	44.58
1988-89	30.20	25.70	25.79	2.79	15.68	43.67
1989-90	28.97	24.53	26.53	2.67	16.41	44.17
1990-91	29.02	24.65	26.49	2.60	16.16	44.18
1991-92	29.39	25.16	25.40	2.47	15.21	44.96
1992-93	28.74	24.56	25.77	2.48	15.36	45.22
1993-94	28.68	24.46	25.50	2.48	15.32	45.57
1994-95	28.27	24.08	26.41	2.40	16.20	45.03
1995-96	26.26	22.39	27.40	2.28	17.30	46.05
1996-97	27.13	23.25	26.60	2.15	16.94	45.96
1997-98	25.89	21.98	26.41	2.33	15.85	47.45
1998-99	25.79	22.04	25.74	2.16	15.00	48.26
1999-2K	24.50	20.96	25.22	2.25	14.60	50.27
2000-01	23.02	19.43	26.00	2.29	15.31	50.98
2001-02	22.92	19.34	25.08	2.21	14.64	51.99
2002-03	20.70	17.26	26.17	2.69	14.87	53.13
2003-04	20.74	17.49	26.01	2.44	14.90	53.25
2004-05	19.03	16.04	27.93	2.86	15.25	53.05
2005-06	18.81	15.83	28.13	2.79	15.39	53.06
2006-07	18.29	15.30	28.84	2.70	16.06	52.87
2007-08	18.26	15.63	29.03	2.72	15.99	52.71

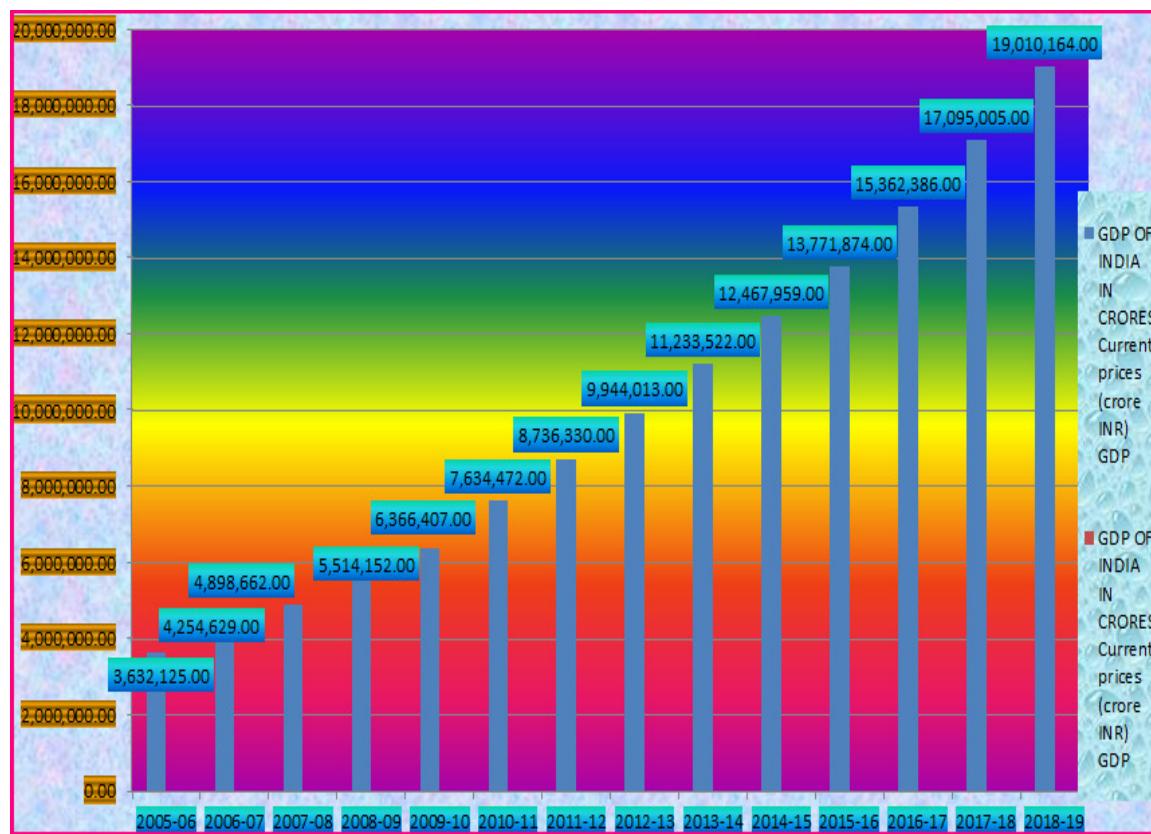
2008-09	17.78	15.21	28.29	2.64	15.43	53.93
2009-10	17.74	15.20	27.76	2.61	15.10	54.50
2010-11	18.21	15.78	27.16	2.83	14.80	54.64
2011-12	17.86	15.50	27.22	2.65	14.73	54.91
2012-13	17.52	15.10	26.21	2.37	14.07	56.27
2013-14	18.20	15.79	24.77	2.13	12.89	57.03
2014-15	17.00	7.00	30.00	2.33	14.15	53.00
2015-16	17.70	17.70	29.80	2.39	16.80	52.50
2016-17	17.95	17.95	29.30	2.41	16.83	52.76
2017-18	17.10	15.40	29.10	18.57	16.70	53.90
2018-19	15.87	18.57	29.73	2.70	16.83	54.40

Accomplishment of nourishment and sustenance security and easing of destitution and joblessness on a manageable premise rely upon the effective and wise utilization of normal assets (land/soil, water, agri-biodiversity and atmosphere). Wasteful use and bungle of gainful assets, particularly land, water, vitality and agro-synthetic compounds has endlessly diminished richness and damaged the physical, substance and organic properties of the dirt. The point of confinement of land availability for farming has just come to. Our proceeded with powerlessness to prudently use these non-sustainable characteristic assets can have genuine ramifications.

Figure 2 : Development in Agriculture & Allied, Agriculture, Industry, Mining & Quarrying , Manufacturing , and service sector



Source : Planning commission, Government of India 2019

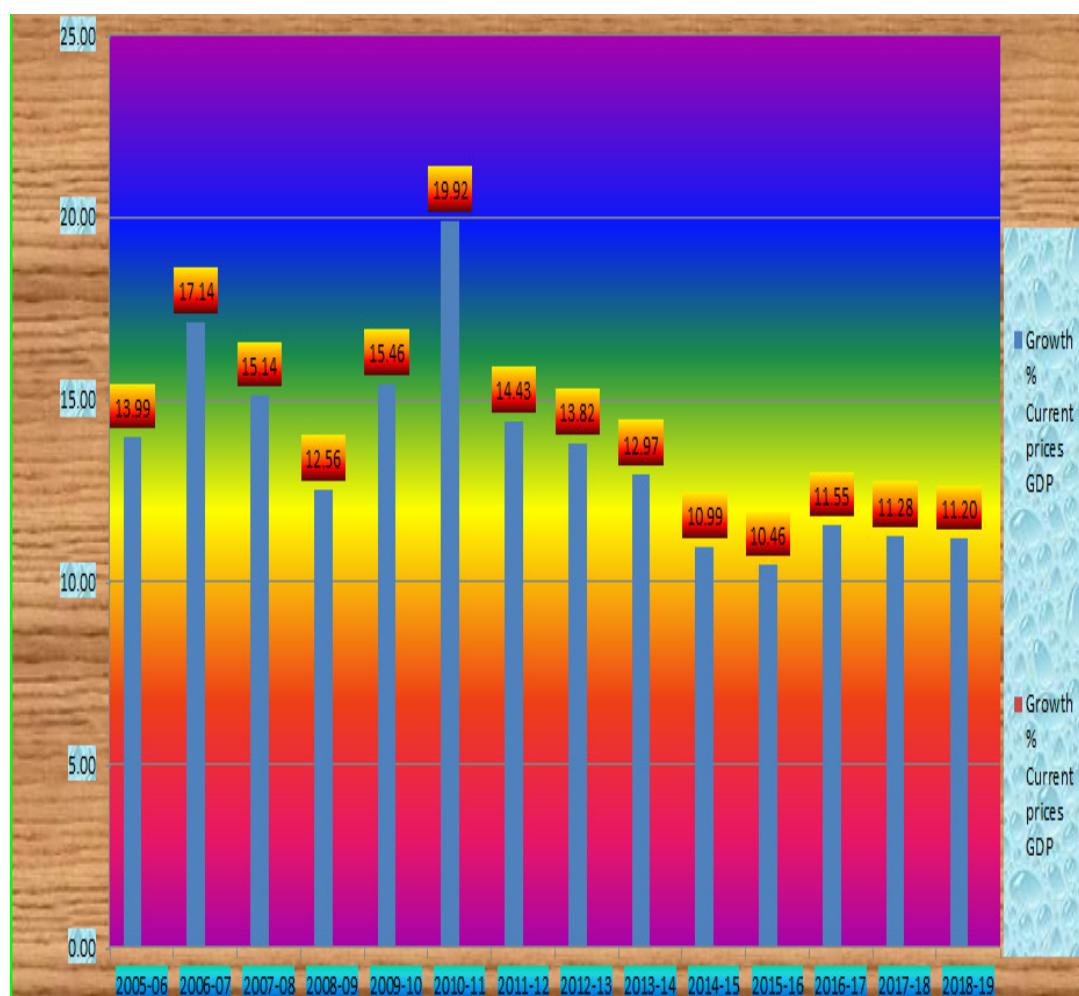
Figure 3 : GDP of India in Current prices (Rs.in Crores)

Source : Planning commission, Government of India 2019 (GDP of India in Crores)

Table 2 : GDP of India in Current prices (Rs.in Crores)

YEAR	GDP	GVA
2004-2005	31,86,332	29,04,299
2005-2006	36,32,125	33,26,914
2006-2007	42,54,629	39,04,895
2007-2008	48,98,662	44,90,188
2008-2009	55,14,152	51,72,838
2009-2010	63,66,407	59,74,906
2010-2011	76,34,472	70,83,671
2011-2012	87,36,330	81,06,947
2012-2013	99,44,013	92,02,692
2013-2014	1,12,33,522	1,03,63,153

2014-2015	1,24,67,959	1,15,04,279
2015-2016	1,37,71,874	1,25,74,499
2016-2017	1,53,62,386	1,39,35,917
2017-2018	1,70,95,005	1,54,82,715
2018-2019	1,90,10,164	1,71,99,815

Figure 4 : Indian GDP Growth in Current prices (In %)

Source : Planning commission, Government of India 2019 (GDP Growth in %)

SOME REMARKABLE REALITIES ABOUT RURAL SITUATION

- ❖ The development in agrarian generation has been stale for as far back as quite a long while.
- ❖ The dry season in north and western parts in FY09 made deficiencies in supply of nourishment grains.
- ❖ Agriculture is the biggest supplier of business in rustic India
- ❖ It contributes 25 percent to India's Gross domestic product
- ❖ It is as yet subordinate principally on the rainstorm

ROLE OF FARMING IN INDIAN ECONOMY

- Contribution to Capital development:
- Providing Crude Material to ventures
- Market for Mechanical Items:
- Share in National Salary:
- Largest Business Giving Part:

IMPORTANCE IN UNIVERSAL EXCHANGE:

- ❖ Market for mechanical item.
- ❖ Earner of remote trade.
- ❖ Indian Farming Status, Significance and Job in Indian Economy
- ❖ Significance for exchange and transport.
- ❖ Source of income for the legislature Share in national salary
- ❖ Source of business
- ❖ Provision of nourishment grains.
- ❖ Supply of crude materials to mechanical part.

CONCLUSION

Change is going on in provincial India however it has still far to go. Agriculture has profited by improved cultivating systems however the development isn't impartial. Land use is changing in rustic zones as ranchers are getting great incentive for their possessions. The exertion ought to be to stop the relocation to urban regions . Wholesale costs are principally used to screen the week by week value developments. The number of basic wares ought to be

diminished to a flat out least, particularly the non-nourishment crops. However, with the development of different areas, the general portion of farming on Gross domestic product of the nation has diminished. In any case, Horticulture keeps on having a prevailing influence in the general monetary situation of India.

Later financial information of India demonstrated that, farming has procured 18 percent of India's Gross domestic product. According to gauges by the Focal Insights Office (CSO), the portion of farming and partnered divisions (counting agribusiness, domesticated animals, ranger service and fishery) was 16.1% of the Gross Worth Included (GVA) during 2014–15 at 2011–12 costs. During Q1 FY2016, horticulture and unified segments developed 1.9% year-on-year and contributed 14.2% of GVA. During FY 2018-2019 the Current prices in GVA was 54.40% in Sector, 15.87% in Agriculture and allied sector, 18.57% in Agriculture, 29.73 in Industrial Services sector, 2.7% in Mining, and 16.83% in Manufacturing sector.

Farming fare comprises 10% of the nation's fares and is the fourth-biggest traded head item. The agro business in India is partitioned into a few sub portions, for example, canned, dairy, handled, solidified nourishment to fisheries, meat, poultry, and nourishment grains. The Branch of

Agribusiness and Participation under the Service of Farming is answerable for the advancement of the horticulture division in India. It deals with a few different bodies, for example, the National Dairy Advancement Board (NDDB), to create other partnered farming areas.

Over the ongoing past, various elements have cooperated to encourage development in the agribusiness segment in India. These remember development for family salary and utilization, extension in the nourishment preparing division and increment in horticultural fares. Rising private investment in Indian horticulture, developing natural cultivating and utilization of data innovation are a portion of the key patterns in the farming business. According to the fourth Advance Assessments, nourishment grain creation is evaluated at 252.68 million tons (MT) for 2014-15. Generation of heartbeats assessed at 17.20 million tons.

With a yearly yield of 138 MT, India is the biggest maker of milk. It additionally has the biggest cow-like populace. India is the biggest merchant of heartbeats at 19.0 MT and 3.4 MT, separately. India, the second-biggest maker of sugar, represents 14% of the worldwide

yield. It is the 6th biggest exporter of sugar, representing 2.76% of the worldwide fares. Because of its significance in national yield and business, farming was given unique consideration by India's strategy producers and advancement organizers which helped this part to assume a significant job in monetary improvement of the nation and in improving pay and expectation for everyday comforts of immense populace reliant on agribusiness. At long last, it has been inferred that horticulture segment has a great deal of difficulties in current wild ecological elements. There is a need of government intercession in horticulture speculation, supporting arrangements for the development of agro-efficiency, trade import and commitment in Gross domestic product. Job of agro-industry, agro-partnered business need an appropriate administration of their contributions to yields to accomplish the targets of horticulture segment in India.

REFERENCES

Arun Chaturvedi, N G Patil, S N Goswami, "Reorienting Land Use Strategies for Socio-economic Development in Uttar Pradesh" Vol. 46, Issue No. 26-27, 25 Jun, 2011.

A S Bhullar, R S Sidhu, Sukhpal Singh , "Farmers' Suicides in Punjab: A Census Survey of the Two Most Affected Districts" Vol. 46, Issue No. 26-27, 25 Jun, 2011

Aruna Singh, P A Lakshmi Prasanna, Ramesh Chand "Farm Size and Productivity: Understanding the Strengths of Smallholder and Improving Their Livelihoods"Vol. 46, Issue No. 26-27, 25 Jun, 2011

J Challa, P K Joshi, Prabhakar Tamboli "Revitalising Higher Agricultural Education in India" Vol. 46, Issue No. 26-27, 25 Jun, 2011

Department of Agriculture and Cooperation, Agricultural Census Division, Ministry of Agriculture 2019.

Directorate of Economics and Statistics, Ministry of Agriculture.
<http://www.importantindia.com/> posted on 30 June 2015.

Kekane M. A., (2013), Indian Agriculture- Status, Importance and Role in Indian Economy, International Journal of Agriculture and Food Science Technology., reviewed by Research India Publications, ISSN 2249-3050, Volume 4, pp. 343-346.

DIRECTORATE OF ECONOMICS AND STATISTICS, MINISTRY OF AGRICULTURE.

<https://statisticstimes.com/economy/sectorwise-gdp-contribution-of-india>

<http://planningcommission.gov.in/sectors/agricul.php?sectors=agri>

A SYSTEMATIC REVIEW ON INDIAN AGRICULTURAL MARKETING

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ABSTRACT

Agriculture in India has directly or indirectly continued to be the source of livelihood to majority of the population. Indian agriculture has seen a lot of changes in its structure. India, predominantly an agricultural economy, has healthy signs of transformation in agriculture and allied activities. India has seen agriculture as a precious tool of economic development as other sectors of production depend on it. Efficient backward and forward integration with agriculture has led to globally competitive production system in terms of cost and quality. Traditionally, agricultural information exchange has been dominated by business media such as newspapers, television and magazines. But now the power of the 21st century is literally in our hands. Digital marketing for Agricultural produces is the need of the hour for developing country like India. The permeation of new technologies combined with the high cost for running a shop force enterprises to search for new sales methods. Network applications and ICT (Information and Communication Technology) can help achieve e-commerce goals. Our country is endowed with a good degree of ethnic and regional diversity. About three-fourth of the total population resides in the rural areas and majority of them are dependent upon agriculture for their subsistence. Agriculture contributes about 24.7% to the Gross Domestic Product (GDP) of the country. It also contributes about 13.1% to the total Indian exports. This sector provides employment to 58.4% of the country's workforce and livelihood to more than 650 million people. Despite this fact, the condition of these people has not shown any significant improvement. Agriculture is the dominant sector of Indian economy, which determines the growth and sustainability. About 65 per cent of the population still relies on agriculture for employment and livelihood.

Keywords: Agricultural economy, backward and forward integration, digital marketing, network applications, e-commerce

INTRODUCTION

Agricultural marketing can be defined as the commercial functions involved in transferring agricultural products consisting of farm, horticultural and other allied products from producer to consumer. Agricultural marketing includes all activities involved in moving agricultural produce from producer to consumers through time (storage), space (transport), form (processing) and transferring ownership at various levels of marketing channels. Agriculture is the backbone of Indian economy. Out of 320 million workforce, 170 million are employed in agriculture. It not only provides food requirements to such a huge population of India but also earns successful returns. Post independence saw a major and rapid growth in Indian agriculture at the rate of 2.6% per annum. India ranks the 1st in the world in terms of milk production. India ranks the 2nd in terms of rice, wheat, groundnut and tobacco production and 3rd in coffee production. India also ranks 2nd in the most arable land in the world, but a problem of low productivity, the yield is only 30% for each crop compared to world standards. India has adequate technology, but it is not fully implemented as our producers lack awareness. Producers expect better returns as they work hard day and night in their fields but doesn't get. Agricultural marketing should be planned and well prepared. In developing countries like India, agricultural markets comprise of poor infrastructure, poor transport and communication, limited rule of law, limited access to finance etc. This result leads to market failure. The emphasis on market failure gave a way to the market orientated liberalization to get "prices and institutes right". With this, there is emergence of state run marketing boards, producer marketing chains ranging from credit unions through farmer cooperatives to wholesale cooperatives. The producer should have accessed to competitive market prices which can only happen when the state inputs all its efforts in strengthening the competitive marketing system. In the mean time the marketing institutions need to maximize efficiency and transparency in transactions with the producers and also of retail/consumers price accruing to the farmers. The agricultural transition towards commercialization is natural though some external forces may slow down its pace like agricultural policies frame work, extent of market imperfections, overall standard of living etc. Indian agriculture planners must pay attention towards the demand for agricultural produce by consumers. The agricultural sector should now attempt to achieve greater market orientation nationally as well as internationally compared to its current focus on production orientation.

REVIEW OF LITERATURE

A considerable amount of research has been done on the working and performance of agricultural marketing in India, by the academicians and researchers. The literature obtained by the investigator, in the form of reports and research studies, is briefly reviewed in this part. **Johnston and Mellor (1961)** in their paper stated that commercial demand for agricultural produce increases due to income and population growth, urbanization, and trade liberalization. Marketed supply simultaneously rises due to productivity improvements in production, postharvest processing, and distribution systems.

Hoff et al. (1993) in their research paper documented that in response to the de-institutionalization of rural areas that followed state compression, the reconstruction of new agrarian institutions complementary to the market and the state is thus a fundamental element of rural development. This has taken the form of either private or cooperative organizations.

Grosh (1994) believed that since the turn of the millennium, attention has shifted toward more micro level and institutional policies. In particular, contractual arrangements with downstream processors, agro exporters and retailers, often orchestrated through farmer groups, are increasingly seen as a means of overcoming the market imperfections that led to the failure of macroeconomic and sectoral adjustment policies.

Reardon and Barret (2000) in their study suggest that when market reforms the commodity prices raise, stimulating an increase in production, especially of the export crops. The rise in price facilitates the establishment of super market chains, cooperatives, export oriented schemes, processing zones and general stimulation of agro industrialization in developing countries

Sivanappan (2000) in his study stated that with modernization of existing post-harvest processing, establishment of suitable infrastructural facilities, huge amount of countries exchequer can be saved and further helps in feeding the teeming population in the country .

Hota et al. (2002) in their study viewed those cooperatives occupy an important part in India's economy in terms of their coverage of rural producers, business turnover and contribution to economic welfare of their members as well as to rural economy of India.

Reardon et al. (2003) in their study documented that private firms now play a dominant role in countries such as China, India, South Africa in developing of improved seed varieties producing and distributing inputs, post harvest operations and retailing through super markets.

Royce (2004) reported, even though State agencies continue to be the main buyers of output and suppliers of input limiting cooperatives management authority within. There is much greater member participation and on-farm decision making.

Ramkishen (2004) in his research paper argued that because of the lack of food processing and storage, the grower is deprived of a good price for his produce during the peak marketing season while the consumer needlessly pay a higher price during lean season.

Godara (2006) in his study described that the positive trend of economic liberalization and associated opening up of Indian economy have significantly reduced the structural rigidities in the system, this trend should be premise of India's future agricultural reform. Agricultural business has come under strong and direct influence of international market. Indian farmers have to produce quality goods to meet the international standards.

Kashyap and Raut (2006) in their paper suggested that, marketers need to design creative solutions like e marketing to overcome challenges typical of the rural environment such as physical distribution, channel management promotion and communication. The “anytime-anywhere” advantage of e-marketing leads to efficient price discovery, offers economy of transaction for trading and more transparent and competitive setting.

Brithal et al. (2007) in their study suggested that by building efficient and effective supply chain using state of the art techniques it is possible to serve the population with value added food, while simultaneously ensuring remunerative prices to farmers.

Tripathi and Prasad (2009) in their paper reported that Indian agriculture has progressed not only in out-put and yield terms but the structural changes have also contributed

Pathak (2009) in his research paper stated that the contribution of agriculture in growth of a nation is constituted by the growth of the products within the sector itself as well as the agricultural development permits the other sectors to develop by the goods produced in the domestic and international market.

TRADITIONAL METHODS OF SALE PREVAILING IN INDIA:

India has a long tradition of periodic markets; most of these are held in rural areas. Rural Primary Markets (RPM) include mainly periodic markets like Haats, Shandies, Mandis, Painths and Fairs, which are estimated between 20,000-45,000 in the country, mostly for small and marginal farmers for marketing their farm produce and purchasing inputs also. Agricultural produce is sold in these markets by the following methods. Hatha system prevailed in India before decades and is even now practiced in most of the agricultural producing states of India, where prices of the produce are settled by the buyer and the

commission agent of the seller. Codes are used in it to fix the price of the produce. Private negotiations are buyers coming to the shops of the commission agent at the time convenient to the latter and after inspecting the sample product, price is offered. In villages private negotiations take place even now between buyer and seller. Under Quotations on the Sample the commission agent takes a sample to the buyers shop and price is offered by the buyer. The produce is sold to the highest bidder. Dara Sale Method is another form of selling agricultural produce where the produce is mixed and then sold as one lot.

In Moghum Sale Method the produce is sold on the basis of verbal understanding between the buyer and the seller without any pre-settled price. Prospective buyers gather at a commission agents shop, where a heap of agricultural produce is assembled, examined and shout out their bids the produce is sold to the higher bidder. In Closed Tender System the produce is displayed at the shop of commission agent with lot size. Buyers can inspect the produce after visiting the shop and offer price on a slip of paper and deposit the slip in a sealed box for buying at the shop of commission agent then the highest bidder is informed and product is sold. Jalap sale is another method where traders try to buy the standing crop at a cheaper rate, a farmer earns without undertaking any further risk and expenses, State trading plays a major role in purchasing agricultural produce from farmers at a fixed procurement prices. The government undertakes this to enable centralized and equal distribution of the produce and assumes better returns to producers.

COOPERATIVE MOVEMENT IN INDIA

Cooperatives came into existence as people have common needs, the producers, the consumers, the workers, the borrowers, the suppliers/distributors felt that they could themselves fulfill through their joint effort and investment. The ultimate aim of the cooperatives is to earn for the welfare of its members, who uses its services has an equal say in its affairs, members of the cooperative share profit and loss in proportion to utilization of services. In India cooperative marketing was one of the efforts to fetch better prices for the produce. Reserve Bank of India gave an institutional definition of cooperative marketing and defined a cooperative marketing society as “an association of cultivators formed primarily for the purpose of helping the members to market their produce more profitably than possible through private trade. Khadi Gramodyog Board of Madhya Pradesh and Hindustan lever limited has entered in Public-Private sector partnership. The joint venture was launched for umbrella brand “Vindhya Valley” under which Hindustan Lever Limited will market the boards’ product in the country.

NEED FOR AGRICULTURAL MARKETING:

- A Farmer should have proper facilities for storing his goods.
- He should have holding capacity, in the sense, that he should be able to wait for times when he could get better prices for his produce and not dispose of his stocks immediately after the harvest when the prices are very low.
- He should have adequate and cheap transport facilities which could enable him to take his surplus produce to the mandi rather than dispose it off in the village itself to the village money-lender-cum-merchant at low prices.
- He should have clear information regarding the market conditions as well as about the ruling prices, otherwise may be cheated. There should be organized and regulated markets where the farmer will not be cheated by the “dalals” and “arhatiyas”.
- The number of intermediaries should be as small as possible, so that the middleman’s profits are reduced. This increases the returns to the farmers.

AGRICULTURAL MARKETING IN INDIA:**➤ Sale to moneylenders and traders**

A considerable part of the total produce is sold by the farmers to the village traders and moneylenders. According to an estimate 85% of wheat, 75% of oil seeds in U.P., 90% of jute in West Bengal and 60% of wheat, 70% of oil seeds and 35% of cotton in Punjab are sold by the farmers in the villages themselves.

➤ Haats and shandies

Haats are village markets often held once or twice a week, while shandies are also village markets held at longer intervals or on special occasions. The agents of the wholesale merchants, operating in different mandies also visit these markets.

➤ Mandies or wholesale markets

In such mandies, business is carried on by arhatiyas. The farmers sell their produce to these arhatiyas with the help of brokers, who are generally the agents of arhatiyas. Because of the malpractices of these middlemen, problems of transporting the produce from villages to mandies, the small and marginal farmers are hesitant of coming to these mandies.

➤ Co-operative marketing

To improve the efficiency of the agricultural marketing and to save farmers from the exploitation and malpractices of middlemen, emphasis has been laid on the development of co-operative marketing societies.

RECENT TRENDS IN INDIAN AGRICULTURAL MARKETING:

With the emergence of new inputs and new technologies in the market. Agriculture has changed from deficit oriented to surplus oriented sector. New methods of marketing like Contract farming are visible, providing farmers with better returns. Contract farming is more practiced now days. The Tata's, The Birla's, The Mahindra's and other corporate houses are entering and expanding agricultural business. With 68,000 plus branches, commercial banks and regional banks have phenomenal strength in financing agri-business ventures. With the newer and newer areas emerging, there is a scope for Agri-business for profitable operations not only to individuals but to institutions as well. The administrators of public and private/corporate have taken the responsibility of translating the research findings and discoveries to concrete programmes and policies of action. The Cooperatives, the Panchayats, the NGO's and the Media must also join hands in the process of transmission of knowledge and information and to provide better market connectivity. Bilateral, Regional and Trade agreement have provided way in reducing tariff and non-tariff barriers to cross boarder flows of agricultural output and increased openness of financial markets, leading to enhanced capital flow into developing countries especially in the form of Foreign Direct Investment (FDI). Moreover, FDI liberalizations have paved many opportunities for making investments in post-harvesting process and agricultural retailing in developing countries since 1990's , this also fostered improved market efficiencies and competitiveness, integration of fragmented markets providing product diversification through differentiation, value additions and technology transfer. These market liberalizations and globalizations have provided opportunities in transforming agro-food markets in India. Food procurement and distribution system is also witnessing the institutional innovations like contract farming, producer associations and super markets. Out of

7310 wholesale markets in the country 7161 are covered under Agriculture Produce Marketing Committee (APMC). As per rule in APMC market, commodity brought by farmer for sale should be kept open on auction floor, where buyers in presence of APMC officials and commission agents bid price and highest bidders are entitled the produce. National Spot Exchange Limited (NSEL) is another type of nationalized transparent electronic spot exchange established in 2005 headquartered in Mumbai. It is a state of art market place providing customized solutions to various problems faced by agricultural producers, processors, exporters, importers, investors and general commodity stakeholders. Indian Public Distribution System (PDS) though old, but has a wider coverage than any other system prevailing in the country. It is estimated that out of 11.2 crore households, 4 crore utilize

services of PDS. PDS distributes essential commodities like wheat, rice, sugar, edible oils etc. Food Corporation of India (FCI) transport bulk quantity to its godowns and then uses PDS to distribute the commodities through its 4.76 lakh Fair Price Shops is the largest of its type in the world. Grameen Sanchar Society (GRASSO), the e-Seva Kendra provides Agri-related services like access to market, price for agricultural products, availability of cold storage facilities, availability of labor and work opportunities. It is a bulk franchisee of Bharat Sanchar Nigam Limited in West Bengal, Odisha and Jharkhand. AGMARKNET-The internet based information system aims at providing “single window” service catering to diversified demands of information with the development of information and data infrastructure market prices will perform role of information service providers, online marketing information will connect distant marketers and promote the efficient marketing in near future. There are several other areas of agricultural marketing with which the user get awareness like adopting best market practices for improving price realization and knowledge is imparted in areas as market driven production programs, post-harvest management, market finance, facilities for quality assurance and standards, packaging and labeling storing and transporting, contract farming, direct marketing, alternative markets, commodity exchange etc. Agricultural and Processed Food Products Export Development Authority an autonomous organization to the Ministry of Commerce, Government of India. It functions as a link between Indian producers and the global markets and also provides financial assistance under various schemes to promote and develop agricultural exports. It has extensive data base of Indian Exporters of Agri produce from all major cities and large towns. Indian Tobacco Company's e-choupal (ITC's e-choupal) also achieved considerable success in agricultural marketing, ITC has set up a small internet kiosk at the village level to provide farmers real time market and pricing related information and highlighting arbitrage opportunities in sales between various mandis. It also provides information related to availability of inputs, weather, market conditions etc. ITC believes that their intervention in this chain has increased their realization on crops between 10%-15% than earlier. Indian leading tractor manufacturing company Mahindra and Mahindra limited has entered the Private sector extension scene through forming subsidiary Mahindra Shublabh Services Limited (MSSL) that runs centre as Mahindra Krishi Vihar (MKV) first operated in Madurai district of Tamil Nadu in October 2000. It provides agriculture extension services and buyers a lot of agricultural produce from the farmers Krushak Bazaars in the state of Odisha fetch 4-41% of higher prices than wholesale market price. Government of Odisha established 40 Krushak Bazaars in the state in 2000-01. The price fixation policy in these Bazaars involves the farmer's decision making. Hadaspar

vegetable market in Pune city is a model for direct marketing of vegetables, there are no commission agents and middle man the purchaser makes payment direct to the farmer. Commodity Future Trading came into existence in 2003 trading for 54 agricultural commodities. The national Horticulture Mission was launched in May 2005 as a major initiative to bring about diversification in agriculture marketing. The other initiatives include DCM Shiram consolidated Haryali Kisan Bazaars. The Godrej group runs a chain of Agri-stores named Aadhaar in Maharashtra and Gujarat. These serve as one stop shop for farmers selling agricultural products. More over websites like ikisan.com, krishivihar.com, agriwatch.com and commodityindia.com provide information to farmers on production and marketing of agricultural commodities.

PROBLEMS AND CHALLENGES AHEAD:

There are several problems and challenges involved in marketing of agricultural produce. Limited access to the market information, low level of literacy among the farmers. There are also many imperfections in the marketing system of agricultural commodities in India. So much has been done to improve the agriculture sector of India, but still it is facing a lot of problems. Some of these can be listed as below.

- Fiscal and Political instability is threatening Agricultural Policies, as there is Political disagreement and fiscal comprehension in agriculture.
- Rising domestic demand for food due to rise in population, restricting our exports.
- Developing people and developing markets.
- Private market intermediation.
- Multi languages and dialects.
- Natural calamities, drought and uneven rainfall in the country.
- Subsistence farming to commercial farming.
- Supply driven technology to demand driven.
- Minimization of land holdings.
- Lack of proper physical communication.
- Infrastructural weakness.
- Less media coverage.
- Lack of professionalism in management.
- Lack of market and marketing information.
- Lack of Agricultural education.
- Inadequacy of institutional markets.

- Multiplicity of market changes and malpractices.
- Lack of technical training.etc

OPPORTUNITIES FOR AGRICULTURAL MARKETING IN INDIA UPFRONT:

India is the third largest producer of fruits [27.83 MT] and 2nd largest producer of vegetables [54 MT]. At present our floriculture contribution to total world export is 0.31%, it can be improved by Green House Technology, timely transportation, storage facilities and good marketing policies. India's existing post-harvest processing capacity can handle only 0.5% of total annual production. But it can be increased by providing industry processing centers with infrastructural establishments. Every year the loss of fruits and vegetables due to lack of post-harvest processing is worth Rs 300 crores. The country must not therefore fitter away the opportunity to diversify and commercialize agriculture, add value to produce, generate employment and income, and export processed food. There is also much scope to promote agriculture through information and communication technology.

CONCLUSION

There is an eminent need for the Agri-marketing initiatives to be large and organized. The present market must cover two aspects of marketing network and actual regulation of the conduct of market. The need to strength the regulated market system arises from changing nature of linkages between agriculture and markets. It has been observed that better and easy market access and efficient information flow can bring much desired market orientation of the production system. Indian agriculture, moving from commoditization to commercialization drives it towards market orientation. India can claim to have largest network of agri-business cooperatives in the world, engaging in performing manufacturing, procurement and marketing of agricultural produce. These have proven to occupy important place in our economy. The government must examine its policies and regulations with view to strength the marketing network and ensure that prices are being determined on competitive basis and markets are being manipulated. Using modern ICT can bring out better solutions as it can facilitate agricultural marketing functions and processes include buying and selling, payment, grading, standardization, transportation in an efficient manner. The agriculture sector needs well-functioning markets to drive growth, employment and economic prosperity in rural areas of India. In order to provide dynamism and efficiency into the marketing system, large investments are required for the development of post-harvest and cold-chain infrastructure nearer to the farmers' field. A major portion of this investment is expected from the private sector, for which an appropriate regulatory and policy environment is

necessary. A good marketing system is one, where the farmer is assured of a fair price for his produce and this can happen only when the following conditions are obtained. The number of intermediaries between the farmer and the consumer should be small; the farmer has proper storing facilities so that he is not compelled to indulge in distress sales, Efficient transport facilities are available; the malpractices of middlemen are regulated. Also Farmers are freed from the clutches of village moneylenders and Regular market information is provided to the farmer.

REFERENCES

- Brithal, P. S., Jha, A. K., & Singh, H. (2007). Linking farmers to market for high value agricultural commodities. *Agricultural Economics Research Review*, 20(conference issue), 425-439.
- Godara, R. (2006). Rural job opportunities agribusiness centres – some realities. *Kurukshetra*, March, 14- 17.
- Grosh, B. (1994). Contract farming in Africa: An application of the new institutional economics. *Journal of African Economies*, 3(2), 231-261.
- Hoff, K., Braverman, A., & Stiglitz, J. (1993). *The economics of rural organization: Theory, practice, and policy*. Oxford: Oxford University Press.
- Hota, S. K., Kishor, B., & Sharma, V. (2002). Agribusiness cooperatives in 21st century-challenges and opportunities. *Agricultural Marketing-A National Level Quarterly Journal of Agricultural Marketing July-Sep.*, 65(2), pp. 33-38.
- Johnston, B. F., & Mellor, J. W. (1961). The role of agriculture in economic development. *American Economic Review*, 51(3), 566-593.
- Kashyap, P., & Raut, S. (2006). *The rural marketing book*. Biztantra, New Delhi, India.
- Pathak, N. (2009). Contribution of agriculture to the development of Indian economy. *The Journal of Indian Management and strategy*, 14(1), 52-57.
- Ramkishen, Y. (2004). *New Perspectives in Rural and Agricultural marketing*. 2nd ed., Jaico Publications, Mumbai, India.
- Reardon, T., & Barret, C. B. (2000). Agro Industrialization, Globalization and International Development: An Overview of Issues, Patterns and Determinants. *Agricultural Economics*, 23(3), 195-205.

- Reardon, T., Timmer, P. C., Barret, C., & Berdegué, J. (2003). The rise of supermarket chains in Africa, Asia and Latin America. *American Journal of Agricultural Economics*, 85, 1140-1146.
- Royce, F. (2004). Agricultural production cooperatives: the future of Cuban agriculture? *Transnational Law and Contemporary Problems*, 14, 19-53.
- Sivanappan, R. K. (2000). Agri-business development in India. *Kisan World*, 27(5), 55-57.
- Tripathi, A., & Prasad, A. R. (2009). Agricultural development in India since in determinants: a study on progress, progress, performance and determinants. *Journal of Emerging Knowledge on Emerging Markets*, 1(1), 63-92.

SUSTAINABLE DEVELOPMENT AND AGRICULTURAL MARKETING OPPORTUNITIES IN INDIA

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ABSTRACT

This paper explains about the Agricultural Marketing and Sustainable Development in Indian economy. This paper introduces the concepts and aims of sustainable agriculture in India. Sustainable agricultural development comprises sustainability of agricultural production and agricultural marketing, sustainability of the rural economy, ecological and environmental sustainability within agricultural systems and sustainability of rural society. India can safely be characterized as an agricultural country despite the recent spurt in manufacturing and services and the declining share of agriculture in the national income, since majority of its workforce (650%) is still engaged in agriculture and allied activities. It has been the noblest profession in India since the time immemorial and has been carried out on sustainable basis. It is only relatively recent phenomenon that large-scale forest areas, grazing lands and waste lands have been converted into croplands to support the rising population, which has caused ecological imbalance and atmospheric pollution. With no further scope for expansion of agricultural land efforts have been made to enhance the production of food grains using high-yielding variety of seeds, fertilizers and irrigation along with advanced farm equipments. Agriculture is the largest source of employment in India, and food accounts for about half of consumer expenditures. Moving agricultural products from the farm to consumers more efficiently could result in large gains to producers, consumers, and India's overall economy. More efficient agricultural marketing generates economy wide gains in output and wages, raises agricultural producer prices, reduces consumer food prices, and increases private consumption, particularly by low-income households. Sustainable agriculture, although a difficult term to define operationally, includes the practice of low input agricultural

production technologies. An important condition to adopt these technologies is the access to markets for low input agricultural products. Ability to market these products at profitable prices would provide incentives for farmers to adopt the necessary methods. Contract farming is considered to be an effective means to introduce new production technologies to the farmers by providing assurance on prices and markets for agricultural products. Public extension agencies in developing countries may therefore be concerned to direct their efforts to introduce contract farming models to rural areas, and to encourage private firms to disseminate information on the appropriate production methods. The paper also emphasizes the importance and objectives of agricultural marketing. The conclusion is that to accelerate economic development of the economy, it is necessary to promote sustainability of agricultural marketing.

Keywords: Sustainable development, environmental sustainability, production methods, consumer expenditures, agricultural marketing

INTRODUCTION

In India Agriculture was practiced formerly on a subsistence basis; the villages were self sufficient, people exchanged their goods, and services within the village on a barter basis. With the development of means of transport and storage facilities, agriculture has become commercial in character; the farmer grows those crops that fetch a better price. Marketing of agricultural produce is considered as an integral part of agriculture, since an agriculturist is encouraged to make more investment and to increase production. Thus there is an increasing awareness that it is not enough to produce a crop or animal product; it must be marketed as well. Agricultural marketing involves in its simplest form the buying and selling of agricultural produce. This definition of agricultural marketing may be accepted in olden days, when the village economy was more or less self sufficient, when the marketing of agricultural produce presented no difficulty, as the farmer sold his produce directly to the consumer on a cash or barter basis. But, in modern times, marketing of agricultural produce is different from that of olden days. In modern marketing, agricultural produce has to undergo a series of transfers or exchanges from one hand to another before it finally reaches the consumer. Agricultural marketing is viewed as a process encompassing all the steps involved from the producers to the consumers including pre and post harvest operations. Such operation adds value to the produce in terms of time, place and farm utilities. Agricultural marketing has assumed increased importance after launching of new economic policy and consequent

opening up of India's market to world market. There has been great concern in the recent years regarding the efficiency of marketing of agriculture produces in India. It is believed that poor linkages in the marketing channels and poor marketing infrastructure are leading to high and fluctuating consumer prices, and to only a small proportion of the consumer rupee reaching the farmers. There is also substantial wastage, deterioration in quality, and frequent mis-match between demand and supply spatially and over time.

The National Commission on Agriculture defined agricultural marketing as a process which starts with a decision to produce a saleable farm commodity and it involves all aspects of market structure of system, both functional and institutional, based on technical and economic considerations and includes pre and post- harvest operations, assembling, grading, storage, transportation and distribution. The Indian council of Agricultural Research defined involvement of three important functions, namely (a) assembling (concentration) (b) preparation for consumption (processing) and (c) distribution. The term sustainable development means different things to different people. But, in essence, it is concerned with meeting the needs of people today without compromising the ability of future generations to meet their own needs.

IMPORTANCE AND OBJECTIVES OF AGRICULTURE MARKETING

The farmer has realized the importance of adopting new techniques of production and is making efforts for more income and higher standards of living. As a consequence, the cropping pattern is no longer dictated by what he needs for his own personal consumption but what is responsive to the market in terms of prices received by him. While the trade is very organized the farmers are not Farmer is not conversant with the complexities of the marketing system which is becoming more and more complicated. The cultivator is handicapped by several disabilities as a seller. He sells his produce at an unfavorable place, time and price. Agricultural marketing plays an important role not only in stimulating production and consumption, but in accelerating the pace of economic development. The agriculture marketing system plays a dual role in economic development in countries whose resources are primarily agricultural. Increasing demands for money with which to purchase other goods leads to increasing sensitivity to relative prices on the part of the producers, and specialization in the cultivation of those crops on which the returns are the greatest, subject to socio-cultural, ecological and economic constraints. It is the marketing system that transmits the crucial price signals.

MAJOR OBJECTIVES OF AN EFFICIENT MARKETING SYSTEM ARE:

1. To enable the primary producers to get the best possible returns,
2. To provide facilities for lifting all produce, the farmers are willing, to sell at an incentive price,
3. To reduce the price difference between the primary producer and ultimate consumer, and
4. To make available all products of farm origin to consumers at reasonable price without impairing on the quality of the produce.

SUSTAINABLE AND AGRICULTURAL MARKETING

Sustainable agriculture is a phrase that has been around for decades; however, it has recently been receiving increased emphasis by businesses, organizations and political leaders. USDA's Ag Outlook Conference a couple months ago focused on sustainable agriculture, as did the Minnesota Agri-Growth Council annual meeting in October 2009. If you ask 100 people to define sustainable agriculture, you will likely get 100 different responses. Every person, business and organization seems to have its own definition of sustainability, as it relates to agriculture.

Twenty years ago, the 1990 Farm Bill defined sustainable agriculture as an integrated system of plant and animal production practices that is site-specific and will achieve the following:

- ✚ Satisfy human food and fiber needs.
- ✚ Enhance environmental quality and the natural resource base upon which the agriculture economy depends.
- ✚ Make the most efficient use of nonrenewable resources and on-farm resources, and integrate, when appropriate, natural biological cycles and controls.
- ✚ Sustain the economic viability of farm operations.
- ✚ Enhance the quality of life for farmers and society as a whole.

A more recent definition of sustainability is meeting the needs of the present, without compromising the ability of future generations to meet their own needs. That definition is quite complex and can have a wide-range of interpretations. Most university experts and business leaders see sustainable agriculture as being sustainable environmentally, economically and socially. The environmental and economic aspects of sustainability have been around for decades, even centuries, in agriculture. The social aspect of sustainability is a

newer concept that is gaining more and more focus in many developed countries in the world, including the U.S.

Many times, agricultural producers can agree on most of the economic and environmental aspects of sustainability, but struggle much more on the social aspects, due to the fact that many of the social aspects are not based on science and economic research, but rather on concepts, opinions, business strategies and personal preferences. Some social examples related to production agriculture include small farms vs. large farms, organic farms vs. traditional farms, range-fed beef vs. feedlot beef etc. Many of these farming and ranching practices have definition problems of their own. For example, naturally grown, which often used in promotion of food products, can have a lot of different meanings to producers and consumers. The use of genetically modified (GMO) seed for crop production has been quite controversial in many foreign countries, as well as in some parts of the U.S., and with some organizations in the U.S. Many groups and individuals question whether or not GMO produced crops should be part of long-range agriculture sustainability. However, the primary benefit of using GMO seed is to control weeds and insects that damage crops, with less dependence on herbicides and insecticides that increase crop production costs, and potentially cause more threats to the environment and human health. The use of farm chemicals in the U.S. actually peaked in 1973, and has declined significantly in the past two decades. Producing food more economically, in a more environmentally friendly manner, would seem to meet a lot of definitions of agriculture sustainability. As mentioned earlier, the concept of sustainable agriculture has existed for decades, and has been emphasized in farm bills as well as other federal and state legislation. Consider some of the agricultural facts and improvements from the past few decades that are related to economic, environmental and social achievements:

- Farmers today grow five times as much corn on 20% less land than they did in 1930.
- In 1940, one U.S. farmer produced enough food and fiber for 19 people, compared to production for 155 people today.
- From 1987 to 2007, average corn productivity increased by over 40%, and has increased at even more rapid pace in recent years.
- Corn producers grow 70% more corn/pound of fertilizer than they did in the 1970s.

- Reduced tillage and improved farm management practices have reduced soil erosion by about 43% in the last twenty years, while soil lost per bushel of corn produced has dropped by 69% during that same period of time.
- Carbon emissions per unit of output in crop production have dropped by one-third in the past 20 years, while energy used per unit of crop production has decreased by 60%.

Emergence of new post-harvest technologies for sustainable agricultural products will need an improved data basis for important tree crops, mainly due to enhanced export potential. Intensive research on post-harvesting, grading, packaging and quality improvements of exporting materials is required. Moreover, export incentives training of personnel, financing, arranging fairs/publicity, etc. would help in maximizing export. The concern of restructuring of agricultural market and mandi, adopting of modern agricultural management to ensure better prices to the farmers, marketing available agricultural commodities to the consumer and food processing industry at reasonable rates, creating basic infrastructure for development of modern marketing system, encouraging the growers to form associations/co-operative organizations for carrying out agricultural marketing activities and developing direct linkages with the wholesalers/retailers/processors/exporters need prompt attention of the individuals, groups and Governments. The bottom line is that we need to produce a lot more food in the future to feed the world. The global population is expected to grow by over 2 billion people in the next 40 years, and it is estimated that we will have that we will have to double today's production levels to adequately feed the world population in 2050. To meet these needs, it will become critically important for agricultural producers, businesses, organizations and political leaders in the U.S., and around the world, to reach consensus on what characterizes sustainable farming practices. As the social aspects of agriculture production gain increasing emphasis, we must be careful not to compromise the economic and environmental sustainability of agriculture, or our ability to provide a safe and adequate food supply. The two institutions: co-operative marketing societies and regulated markets, together can assure, the presence of all these conditions. Accordingly if cooperative marketing societies are developed on the lines indicated above (along with regulated markets), the Indian agricultural marketing system can be considerably improved. Especially in the current economic climate, food and beverage corporations need to assess all risks associated with their primary raw materials. This 45-minute breakfast briefing is a chance for

delegates to familiarize themselves with the key definitions associated with sustainable agricultural sourcing practices. Different agricultural regions, both nationally and globally, have specific challenges, whether its water, carbon or social. The objective of this session is to set the scene for the event, by defining the boundaries of the triple bottom line, in both national and global sourcing situations.

- Explaining what sustainable agricultural practice means for different food and beverage sectors and categories
- Characterizing the boundaries of the triple bottom line
- Exploring the specific link between water and the agricultural supply chain - understanding why water is a critical sustainable sourcing driver
- Defining the key impacts and concerns upstream including carbon, fertilizers, soil fertility, land use, energy usage, farmer social impacts and food safety
- Examining the tradeoffs between sustainability and the availability of economically viable raw materials

CAUSES FOR POOR MARKETING OF AGRICULTURAL PRODUCTS IN INDIA:

Indian system of agricultural marketing suffers from a number of defects. As a consequence, the Indian farmer is deprived of a fair price for his produce. The main defects of the agricultural marketing system are discussed here.

1. **Improper Warehouses:** There is an absence of proper warehousing facilities in the villages. Therefore, the farmer is compelled to store his products in pits, mud-vessels; store houses etc. these unscientific methods of storing lead to considerable wastage. Approximately 1.5% of the produce gets rotten and becomes unfit for human consumption. Due to this reason supply in the village market increases substantially and the farmers are not able to get a fair price for their produce. The setting up of central warehousing corporation and state warehousing corporation has improved the situation to some extent.
2. **Lack of grading and standardization:** Different varieties of agricultural produce are not graded properly. The practice usually prevalent is the one known as “dara” sales wherein heap of all qualities of produce are sold in one common lot thus the farmer producing better qualities is not assured of a better price. Hence there is no incentive to use better seeds and produce better varieties.

3. **Inadequate transport facilities:** Transport facilities are highly inadequate in India. Only a small number of villages are joined by railways and Pucca roads to mandies. Produce has to be carried on slow moving transport vehicles like bullock carts. Obviously such means of transport cannot be used to carry produce to far-off places and the farmer has to dump his produce in nearby markets even if the price obtained in these markets is considerably low. This is even more true with perishable commodities.
4. **Presence of large number of middlemen:** The chain of middlemen in the agricultural marketing is so large that the share of farmers is reduced substantially. For instance, a study of D.D. Sidhan revealed, that farmers obtain only about 53% of the price of rice, 31% being the share of middle men (the remaining 16% being the marketing cost). In the case of vegetables and fruits the share was even less, 39% in the former case and 34% in the latter. The share of middle-men in the case of vegetables was 29.5% and in the case of fruits was 46.5%. Some of the intermediaries in the agricultural marketing system are-village traders, Kutch arhatiyas, Pucca arhatiyas, brokers, wholesalers, retailers, money lenders, etc.
5. **Malpractices in unregulated markets:** Even now the number of unregulated markets in the country is substantially large. Arhatiyas and brokers, taking advantage of the ignorance, and illiteracy of the farmers, use unfair means to cheat them. The farmers are required to pay pledging charge to the arhatiyas, weight charge for weighing the produce, “palledari” to unload the bullock — carts and for doing other miscellaneous types of allied works, “garda” for impurities in the produce, and a number of other undefined and unspecified charges. Another malpractice in the mandies relates to the use of wrong weights and measures in the regulated marks. Wrong weights continue to be used in some unregulated markets with the object of cheating the farmers.
6. **Inadequate market information:** It is often not possible for the farmers to obtain information on exact market prices in different markets. So, they accept whatever price the traders offer to them. With a view to tackle this problem the government is using the radio and television media to broadcast market prices regularly. The

newspapers also keep the farmers posted with the latest changes in prices, however the price quotations are sometimes not reliable and sometimes have a great time lag. The trader generally offers less than the price quoted by the government news media.

7. **Inadequate credit facilities:** Indian farmer, being poor, tries to sell off the produce immediately after the crop is harvested though prices at the time are very low. The safeguard of the farmer from such “forced sales” is to provide him credit so that he can wait for better times and better prices. Since such credit facilities are not available, the farmers are forced to take loans from moneylenders, while agreeing to pledge their produce to them at less than market prices. The cooperative marketing societies have generally catered to the needs of the large farmers and the small farmers are left at the mercy of the moneylenders.
8. **Unfair practices by middlemen:** The middlemen engaged in the distribution of agricultural produce adopt several unfair practices, such as manipulation of weights and measures, manipulation of prices, taking always a large quantity of the produce as samples etc.
9. **Excessive marketing charges:** The marketing charges required to be paid by the farmers for the marketing of their produce are excessive. They are required to pay heavy charges for loading, unloading, commission, etc.
10. **Unorganized farmers and poor staying power of farmers:** While the merchants who buy the agricultural produce are well organized, the farmers who sell the produce are not at all organized. As they are not organized, they do not have bargaining power in marketing their produce. They have to dispose of their produce at the prices offered by the dealers. The farmers in India are generally, poor and heavily indebted. As such, they do not have staying power (i.e. they cannot hold back their produce until they get better prices). They are forced to sell their produce immediately after harvest. As a result, they are not able to get fair prices for their produce.

Some of the other various causes that led to poor marketing of agricultural products in the country are as follows:

- Fluctuations in agriculture prices and supplies (surpluses/scarcities)
- Conflicting interests of farmers, middlemen and consumers
- Under utilization of resources such as rural godowns, market yards etc.
- Inadequate transportation, communication and information network.
- Imbalance in the spread of internal marketing network as well as in products
- Other factors such as distribution, seasonability, perishability, and enormity of production, storage, lack of processing make the problem of marketing more complex.
- Problem of plenty due to increased agricultural production leads to glut in the market and ultimately fall in price.
- Problem of scanty due to inadequate production, crop failure may finally result in rise in prices.

Among these problems, communication plays a vital role in determining the success or failure of commercialization marketing of the agricultural produce in rural India. The extension system in the rural areas should be re-oriented to meet the challenges in 21st century due to globalization. The following systemic approach will help the extension officers to a greater extent in increasing the profits of small and marginal farmers in the rural India.

MEASURES TO IMPROVING AGRICULTURAL MARKETING:

As stated earlier, an efficient agricultural marketing system is essential for the successful development of agriculture. But the agricultural marketing system in India is defective in several respects. So, remedial measures have to be adopted for improving the agricultural marketing system in the country. In fact, of late, the government of India has adopted several measures to improve the agricultural marketing and to protect the farmers against the exploitation by middlemen.

The various steps or measures undertaken by the government of India for the improvement of agricultural marketing in India are:

1. **Marketing Surveys:** In the first the Government has undertaken marketing surveys of various goods and has published these surveys. These surveys have brought out the various problems connected with the marketing of goods and have made suggestions for their removal.

2. **Grading and standardization:** The government has done much to grade and standardize many agricultural goods. Under the agricultural produce (Grading and Marketing) Act the Government has set up grading stations for commodities like ghee, flour, eggs etc. The graded goods are stamped with the seal of the Agricultural Marketing Department AGMARK. The “AGMARK” goods have a wider market and command better prices.
3. A Central Quality Control Laboratory has been set up at Nagpur and Eight other regional laboratories in different parts of the country with the purpose of testing the quality and quantity of agricultural products applying for the government’s “AGMARK” have been created the Government is further streamlining quality control enforcement and inspection and improvement in grading.
4. **Establishment of regulated markets:** Regulated markets have been set up in all the important towns and cities of India for improving the agricultural marketing system. The number of regulated markets has increased considerably over the past 44 years. Their number has increased from 265 in 1950-51 to 4,452 on 31st March, 1980. By 31st March, 1994, their number had risen to 6,809.
5. Regulated markets are markets set up by the State Governments in towns and cities for the efficient marketing of agricultural produce. The affairs of regulated markets are looked after by a market committee consisting of the representative of growers, traders, local bodies and the State Government.
6. The main functions of regulated markets are;
 - i. They ensure correct weights and measurement
 - ii. They standardize the market charges and prices
 - iii. They issue licenses to dealers in regulated markets and ensure that the rules and regulations of regulated markets are observed by the dealers.
 - iv. They also provide warehousing facilities for the produce of the farmers
 - v. They provide market information about the prevailing market prices of agricultural products.

7. The regulated markets are of immense help in agricultural marketing. They help in the disposal of the products at fair prices. They help in the elimination of unhealthy market practices. They provide storage facilities for agricultural produce. They also provide market information about the prevailing prices.

8. **Setting up of Co-operative Marketing Societies:** The Government has encouraged the setting up of large number of co-operative marketing societies for the efficient marketing of agricultural produce. There has been much progress in this direction. A large number of co-operative marketing societies have been set up in the country. There are not only primary co-operative marketing societies, but also central marketing societies at the district level, state marketing federations at the state level and the National Agricultural Co-operative Marketing Federation at the all India level. Again there are separate state marketing federations for special commodities. Today, There are 6,000 primary marketing societies, of which 3,500 are special commodity marketing societies, 160 central marketing societies, 45 state marketing federations, (29 general purpose corporation and 16 special commodities marketing federations), 3 central marketing federations for special commodities and the National Agricultural Marketing Federation (NAFED) of agricultural produce.
 - i. They provide credit facilities to the co-operative marketing societies have been of immense help to the farmers. They render the following services to farmers;
 - ii. They help the farmers to market their produce at better prices and thereby protect them against the exploitation by the middlemen.
 - iii. They provide the necessary ware housing or storage facilities for the agricultural produce of the farmers.
 - iv. They undertake even the grading of agricultural produce.
 - v. They also undertake the processing farmers
 - vi. They even supply consumer goods to the farmers at fair prices.

9. **Expansion of Ware housing facilities:** The Government has done much expand the ware housing facilities for agricultural produce. The Central Government has set up the central ware housing corporation on 2nd March, 1957 for the purpose of construction and maintenance of storage facilities at centers of all India importance for agricultural commodities. The various state Governments have established state

warehousing corporations for the construction and maintenance of storage facilities at places where the central warehousing corporation has not provided such facilities. Besides the central and State warehousing corporations, the food corporation of India also has set up a large number of godowns throughout the country for the storage of buffer stocks of food grains. The government has also encouraged the co-operative marketing societies, regulated markets and even primary credit societies to set up godowns in many areas. Thanks to the efforts taken by the central and state governments, the ware housing and storage facilities in the country have increased considerably, and these storage facilities have enabled the farmers to keep their produce in the ware houses until they get better prices.

10. Extensions of Transport facilities to rural areas: The Government has also extended transport facilities connecting rural areas with the marketing centers. The extension of transport facilities to rural areas has helped the farmers to take their produce to distant markets and get better prices for their produce, and also helped them to reduce the cost of marketing their produce.

11. Provision of Market Information: The Government has made arrangements to provide market information about the prevailing or current pieces of agricultural crops through All India Radio and the Press. The market information about the prices of goods will be helpful to the farmers in selling their produce at the best prices.

12. State Trading in food grains: The Government has participated in trading in food grains. It is true that state trading in food grains is primarily intended for procurement of food grains for building up buffer stocks for distribution among deficit states. But it is also intended to help the farmers to get reasonable prices for their produce.

FACILITIES NEEDED FOR AGRICULTURAL MARKETING

In order to have best advantage in marketing of his agricultural produce the farmer should enjoy certain basic facilities. Some of the basic facilities are as follows:

- He should have proper facilities for storing his goods.

- He should have holding capacity, in the sense, that he should be able to wait for times when he could get better prices for his produce and not dispose of his stocks immediately after the harvest when the prices are very low.
- He should have adequate and cheap transport facilities which could enable him to take his surplus produce to the mandi rather than dispose it off in the village itself to the village money-lender-cum-merchant at low prices.
- He should have clear information regarding the market conditions as well as about the ruling prices, otherwise may be cheated. There should be organized and regulated markets where the farmer will not be cheated by the -dalals- and –arhatiyas
- The number of intermediaries should be as small as possible, so that the middlemen's profits are reduced. This increases the returns to the farmers.

ACTION TAKEN RECENTLY

- NSAC signed onto a letter from Feeding America to Representatives in support of the Child Nutrition Reauthorization Bill.
- NSAC submitted Comments on the interim rule for the Rural Micro entrepreneur Assistance Program, July 27, 2010.
- In advance of the 2012 Farm Bill, NSAC hosted two producers to testify before the House Agriculture Subcommittees. Click here to view the testimony of Van Ayers before the Subcommittee on Rural Development, Biotechnology, Specialty Crops and Foreign Agriculture and click here to view the testimony of Margaret Smith before the Subcommittee on Horticulture and Organic Agriculture.
- NSAC launches Guide to USDA Funding for Local and Regional Food Systems work, April 2010.
- Letter from 41 organizations to House and Senate urging \$50 million in mandatory funding for Farm to School, May 3, 2010.
- Two-page summary of the \$50 million dollar ask for Farm-to-School from the Farm to School Collaborative (of which NSAC is a member).
- NSAC submits comments on the proposed rule for the Rural Micro entrepreneur Assistance Program, November 20, 2009.
- NSAC submits comments on the interim final rule for the Interstate Shipment of State-Inspected Meats, November 16, 2009.

- NSAC submits comments on the proposed “naturally-raised” meat label claim, November 13, 2009.
- Updated list of USDA State Rural Development Directors, October 27, 2009.
- NSAC recently submitted these Comments on Rural Development Guaranteed Loans Interim Rule.

SUSTAINABLE AGRICULTURAL EXPORT

Agriculture, a core sector of the Indian economy, accounts for 30 per cent of the Country's GDP, 20 per cent of total export earnings, two thirds of country's workforce and livelihood for 70 per cent of the total population. The past accomplishments of this sector are a great strength to face the current problems and future challenges in the areas of greater efficiency (competitiveness), sustainability, poverty alleviation and continued food self sufficiency. With trade liberalization, agricultural exports have also become an important national goal. The new economic regime, initiated since early nineties, has led to resetting of the goals of Indian agriculture towards global competitiveness and export orientation without compromising the basic premise of self-reliance. The emergence of the concept of sustainability of agricultural production has made the task more difficult for all those who are associated with agricultural production systems in the country. The present goals of Indian agriculture warrant reformation of strategies and action plans. Agricultural exports increased from about 600 million US dollars in 1960-61 to 3520 million US dollars in 1990- 91. During post economic reforms period, the value of agricultural exports has nearly doubled. The share of agri-exports in total exports, however, has remained more or less stable around 20 per cent, though the share of exports in agricultural GDP has been rising. Commodities such as marine products, oil meals, rice, coffee, tea, spices, cashew, tobacco, castor oil, groundnut, sesame, fresh fruits, vegetables, pulses etc., are important export earners and are being exported to more than 110 countries. The encouraging results of goal-oriented Green Revolution, White Revolution, Yellow Revolution etc. enthuse the agricultural fraternity of the country to set a new goal for „Agri-Export Revolution“ which is not only the need of the hour but also a compulsion to strengthen and revitalize the economy of the country. While India holds an important position in the export market for a set of traditional agricultural commodities, new areas and new commodities are likely to emerge such as live animals and animal products, fruits, vegetables, floriculture, medicinal plants and processed agricultural products. In order to understand the emerging challenges and to identify ways and means of placing our country

as a major player in the global export market for agricultural products, the National Academy of Agricultural Sciences (NAAS) in collaboration with the Rajasthan Agricultural University, Bikaner and the State Government of Rajasthan deliberated on the theme “Sustainable Agricultural Export” during the Fourth Agricultural Science Congress held at Jaipur in February, 1999.

AGRICULTURAL EXPORTS - ADVANTAGE INDIA

Since independence, India has made rapid strides in agricultural production. Salient attainments include the following:

- ✓ Food production has increased from a mere 50 million tonnes in 1947 to over 199.30 million tonnes during 1996-97, and per capita net availability of food grains has grown from 395 gm per day in early 50s to 529gm in 1996-97.
- ✓ The country is now the largest producer of milk and the second largest producer of fruits and vegetables in the world.
- ✓ Oilseeds production has increased from 5.2 million tonnes in 1950 to 22.24 million tonnes in 1997.
- ✓ Fish and marine food production has risen from 7.5 to over 50 million tonnes, at present.
- ✓ Quality seed production which was negligible in 1947 has shown a quantum jump and is currently placed at 7 million quintals. A large number of private seed companies have also come up.
- ✓ Both the irrigated and the potentially irrigated areas have increased since Independence. Efficient methods like sprinkler and drip irrigation have become popular in arid and semi-arid areas.
- ✓ The total fertilizer consumption has gone up and India now ranks fourth in the world, although the per unit area consumption is still low.
- ✓ India is also the largest reservoir of trained manpower in the world.
- ✓ Despite agriculture sector being not-taxed, prices of several agricultural commodities are below international prices, thus conferring trade advantages. Despite impressive strides that the country has made in agricultural production, India has not yet become a major player in the international arena as far as exports are concerned.
- ✓ The broad export strategy for Indian agriculture would, therefore, be to strengthen and widen the export market for established „commercial commodities“ like tea, coffee,

spices, cotton, jute, sugar, oil meals etc., and also to create and capture new export market for „dynamic commodities“ like meat, dairy products, poultry, fishery products, vegetables, fruits, floriculture etc., whose demand in the international market is buoyant. India has a comparative advantage in many of these commodities due to availability of varied agro climatic conditions, diversified commodity mix and low wage rates leading to lower cost of production etc. The major plank of our foreign trade strategy must be on finding a niche for exports of the above mentioned non-conventional and dynamic commodities. This has to be achieved in the context of stricter control processes under Sanitary and Phytosanitary (SPS) Agreement and other non-tariff barriers viz., Technical Barriers to Trade (TBT), etc.

CONCLUSION

A good marketing system is one, where the farmer is assured of a fair price for his produce and this can happen only when the following conditions are obtained, the number of intermediaries between the farmer and the consumer should be small; the farmer has proper storing facilities so that he is not compelled to indulge in distress sales, efficient transport facilities are available, the malpractices of middlemen are regulated, farmers are freed from the clutches of village moneylenders and regular market information is provided to the farmer. The central and state governments have taken up a number of measures for improving the agricultural marketing in the country. Thanks to the various measures undertaken by the government, agricultural marketing has improved considerably in recent years. But still, a great deal remains to be done in agricultural marketing, especially in the fields of grading, expansion of warehousing facilities and extension of transport facilities to rural areas. Agriculture continues to play a pivotal role in most Asian countries. Its contribution to their gross domestic product is substantial, its share in employment is high; and a large part of exports is accounted for by agricultural commodities. In the family budget of the majority of households, food and agricultural products account for the largest share. With greater focus on sustainable development, agriculture has acquired a new significance. Sustainable use of land and water, application of pesticides and fertilizers, the place of animals, prospects for afforestation, and issues of biodiversity are considered vital. As should be expected, the records of Asian countries vary in these respects. Yet there are several common features and emerging trends in agricultural development in the region which have a bearing on its march towards sustainable development.

REFERENCES

- Anirbau Biswas (2004). “Agricultural Marketing in India”, 13th July 2004, pp. 1-4.
- Raman, B.S. (1998). ”Elements of Indian Economy”, United Publishers, Jeppu, Mangalore- 575001, pp. 129-134.
- Carter, S. (1997). “Global agricultural marketing management (marketing and agribusiness texts-3)”, Food and Agriculture Organization of the United Nations (FAG), Rome, Italy.
- Kotler, P., Armstrong, G., Sounders, J. and Wong, V. (2002). “Principle of marketing”, 3rd European edition, Practice Hall, Upper Saddle River, NJ, USA, p. 56.
- Brousseau, E and J M Glachant (2008): New Institutional Economics: A Guidebook (Cambridge: Cambridge University Press).
- Byres, T J (1974): “Land Reform, Industrialization and the Marketed Surplus in India: An Essay on the Power Rural Bias” in D Lehmann (ed.), Agrarian Reform and Agrarian Reformism
- (London: Faber & Faber). – (1977): “Agrarian Transition and the Agrarian Question”, Journal of Peasant Studies, 4(3):258-74.– (1997): The State, Development Planning and Liberalisation in India (Delhi: Oxford University Press).
- Cardinale, B et al (2012): “Biodiversity Loss and Its Impact on Humanity”, Nature, 486: 59-67.
- Chadha, G K (2007): “The Rural Non-farm Sector in the Indian Economy: Growth, Challenges and Future Direction” in A Gulati and S Fan (ed.), “The Dragon and Elephant”: Agricultural and Rural Reforms in China and India (New Delhi: Oxford University Press).
- Chakraborty, A and S Cullenberg (2003): Transition and Development in India (New York: Routledge).
- Chari, S (2004): Fraternal Capital: Peasant-workers, Self-made Men and Globalization in Provincial India (New Delhi: Permanent Black).
- Chattopadhyay, B (1969): “Marx and India’s Crisis” in P C Joshi (ed.), Homage to Karl Marx (Delhi: People’s Publishing House). – (1981): “An Approach to the Research Design for the Study of Market Circuits in Eastern India”, CRESSIDA, Calcutta, mimeo.
- Colman, D and Young, T (1997): Principles of Agricultural Economics: Markets and Prices in Less Developed Countries, 2nd edition (Cambridge: Cambridge University Press).

- Crow, B (1989): “Plain Tales from the Rice Trade: Indications of Vertical Integration in Food grain Markets in Bangladesh”, *Journal of Peasant Studies*, 16(2): 198-229. – (2001): *Markets, Class and Social Change: Trading Networks and Poverty in Rural South Asia* (New York: Palgrave).
- Darling, M L (1928): *The Punjab Peasant in Prosperity and Debt*, second edition (London: Oxford University Press).
- Narrod, C, D Roy, J Okello, B Avendano, K Rich and A Thorat (2009): “Public-Private Partnerships and Collective Action in High Value Fruit and Vegetable Supply Chains”, *Food Policy*, 35(1): 8-15.

**THE THREE ROLES OF AGRICULTURAL MARKETS
A REVIEW OF IDEAS ABOUT AGRICULTURAL COMMODITY MARKETS IN
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ABSTRACT

This paper is a review of the literature on agricultural commodity markets in India, in relation to the three vital roles these markets are thought to play. It outlines the strengths and limitations of each approach and shows how they contribute to our understanding of the workings of real markets. The paper also suggests a holistic view of markets, built on the basis of the insights of existing literature to enrich our knowledge of the complexity and diversity of real markets and assist realistic policymaking.

Keywords: Real markets, agricultural commodity, complexity and diversity, realistic policymaking

INTRODUCTION

The need for a special issue dedicated to the study of agricultural commodity markets in India highlights a paradox within the field of development economics: the crucial role played by commodity markets contrasts starkly with a relative dearth of studies of “real markets” in general, and of real agricultural markets in particular (Hewitt de Alcantara 1993). This paradox is due not only to the reified manner in which the “market” is treated in mainstream development literature (whether neoclassical or new institutional) but also to the intellectual privileging of production within political economy, to the neglect of exchange relations.¹

While mainstream economists have tended to view markets in terms of their role in driving efficient resource allocation, real agricultural markets function in a far more complex manner and perform a wide range of other tasks critical to the processes of social reproduction and development. Real markets connect producers to consumers, town to countryside and the agrarian to the non agrarian economy. Operating through a great variety of institutions, they function on limited information and give rise to a wide variety of social classes and power relations (Mackintosh 1990: 47). The behaviour attributed to the abstract market of mainstream economics is far removed from the manner in which “actually existing markets” function (Harris-White 1999: 1).

Yet considerable progress has been made in advancing our understanding of the diversity and complexity of agricultural markets: indeed, we know much more about their workings today than we did when the first crop marketing reports were published by the colonial government during the inter-war years (for example, GoI 1937). But the pace of progress in understanding has been lethargic, largely owing to the influence of mainstream economic theory and its narrow concern with the efficiency roles of markets, focusing on price performance, which privileges regression and price integration analysis to the neglect of the social institutions of marketing systems. Nonetheless, critical scholars have pointed out that if markets are simply stylised as channels of price information our understanding of their roles is incomplete in at least two crucial additional respects. First, through the terms of trade, and the profits and investments made by merchants, agricultural markets are conduits for the extraction of resources from agriculture to industry and vice versa. And second, through the terms of multiple exchanges and the physically productive activities that take place in the process of commercial exchange, they are also arenas for the exploitation of labour and peasants. The aim of this essay, then, is to review the literature on agricultural commodity markets in India, looking primarily at the different ways in which their three major roles have been conceptualised. We outline the strengths and limitations of each approach and show how they contribute to our understanding of the workings of real markets. Finally, we will suggest how a holistic view of markets built on the basis of the insights of the existing literature can enrich our knowledge of the complexity and diversity of real markets, and assist realistic policymaking. Before beginning our review of the literature, however, we need to comment on a distinctive new trend that has crept into mainstream studies of agricultural markets and which forms part of the context in which the present paper has been written.

MARKET EFFICIENCY AND THE POST-THEORETICAL TURN

The research agenda on agricultural commodity exchange has been moving beyond the restrictive theoretical framework of neoclassical economics into a direction that can best be described as “post-theoretical”.³ The chief characteristic of this body of work is an empiricist bias towards “issue-driven” inquiries into markets which abandon any engagement with theory.⁴ A critique of “empiricism” must not, however, be taken as an indictment of empirical research; in fact, in our opinion, the study of the internal complexities of agricultural commodity markets and their linkages to the production system demands intensive field-based inquiries. Most studies of commodity markets quoted in the review, including those by one of us, are all based on field research. However, field experience has taught many researchers the importance of developing theoretical frameworks with which to make sense of their accumulated data, evidence and observations. Thus, empirical material and theory presuppose one another. In the absence of such theory, as is the case with “empiricist” research, untheorised generalizations from specific cases have become common, along with contradictory claims, stemming from the same empirical research, which the authors appear to feel no need to resolve (Ganesh-Kumar et al 2010).

Thus, researchers have no reticence in drawing, for example, from a study of cauliflower production for supermarkets (Joseph et al 2008) and from a fine-grained stakeholder project on retail prices in Delhi (Minten et al 2010), the conclusion that exchange with large-scale retail is beneficial to both consumers and cultivators. A case study of public distribution system (PDS) leakages in Rajasthan is seen as a comprehensive study justifying an indictment and “major overhaul” of the system at the all-India level (Khera 2011 cited in Basu 2011: 54), while features of food grain markets are elided with those of groceries, fruit and vegetables, and general retail inventory (Reardon and Minten 2011a). Disengagement with theory results in a reluctance to grapple with real contradictions found within marketing systems. For instance, private traders may have costs 70% below those of the “seriously inefficient” Food Corporation of India (FCI), but on the other hand traders are oligopsonists in their relations with farmers and oligopolists in relation to consumers (Ganesh-Kumar et al 2010). Evidence may be replaced by supposition – as when the sensitive question of high storage loss estimates, meticulously researched by Lipton and his team in the 1970s (Boxall et al 1977) and subsequently forgotten, becomes: “15-50%” (Gomez et al 2011) and “it is hypothesized that physical waste is high” (Reardon and Minten 2011a: 15), or (small) farmers “usually gain” from direct procurement to agri-business, or wholesale markets are “seemingly” the most important procurement method (*ibid*).

The contemporary “empiricist turn” apparently leaves practitioners feeling free to ignore the policy-relevant aspects of agricultural markets identified in older approaches that attempted to theorise the roles markets play. The concerns of the agrarian question: the diverse roles that rural exchange, marketing and infrastructure must play in the “infinitely varied” capitalist transformations of production and distribution are now low down on the agenda (as noted in Goswami 2010). Labour relations and processes are missing, because the very idea of agricultural markets as theatres of exploitation is missing. Employment in agricultural markets is hardly noticed beyond casual estimates which range from “many millions” (Minten et al 2010) through 56 million (Joseph et al 2008: 35) to “hundreds of millions of livelihoods” (Reardon and Minten 2011a). The now urgent practical question of the net labour displacing effects of capital-biased “modern retail” under scenarios of varying rates of expansion cannot be answered with confidence. To take another example, a set of institutions of speculation that have been found to have exacerbated the price spike of 2007-08 – banks, asset management enterprises, investment funds and institutional investors – are not visible in the set of dynamic, complexifying elements identified as constituting modern agricultural marketing systems in India, ignoring their impact on systemic price stability and rural credit alike. Even the extractive role of marketing credit is ignored in this literature. New avenues such as commodity futures trading in India (the total value of which – mostly from agricultural products – had increased to Rs 1,30,000 crore by 2003 and on which markets the amount of rice, wheat and maize traded was 309.78 lakh tonnes in 2006-07) have been termed “steps in the right direction” towards price discovery and risk management (Gulati and Fan 2008: 2). This conclusion ignores, first, the geographical concentration of futures exchanges in the metropolitan centres and the linguistic concentration of the computerised trade in English, which excludes the vast majority of farmers, most of whom are smallholding “net buyers of food” with little money to speculate in such markets (Kabra 2007: 1164). Second, and more importantly, it ignores the great disproportion between futures transactions and the actual physical availability of certain commodities (the former far in excess of the latter); this results in wild price fluctuations owing to purely speculative activities and severely qualifies the announced purpose of futures exchanges as enabling efficient price discovery (Ghosh 2010). Moreover, the conflict between local capital and “modern retail” and its associated logistics – which slows the implementation of reforms – finds no place in “thick descriptions” that reflect the social vision of their authors, rather than Indian realities. While empiricist researchers have constantly emphasised the beneficial impact that the introduction of large-scale retailers into the food market will bring, such as greater integration

of markets, lower prices for consumers as well as lower waste within the supply chains (Reardon and Minten 2011b), they have not paid much heed to scholars who have identified malpractices towards producers by supermarkets in “buyer-driven” supply chains. These include delayed payments, reductions in prices at the last minute when suppliers have no alternatives, removal of suppliers from lists for no good reason, high interest rates, and the use of restrictive contracts with tough penalties for any non-compliance (Singh 2011: 14). Likewise, researchers are not shy of identifying general benefits of contract farming for small farmers in terms of greater efficiency, lower risks and higher returns with a single case study of poultry growers in Andhra Pradesh for evidence (Ramaswamy et al 2006). This practice overlooks the fact that the contractual relationship between producers and large corporations reduces smallholders with lesser bargaining power effectively to wage-labour status with the former deciding everything from the type of crop, choice of inputs, the amount of credit, and timing of sales. In many cases, agri-business may completely dispense with the inconvenience (“transactions costs”) of finding a large number of small farmers and providing them with inputs and credit by preferring to deal with larger farmers, thus creating a bias that has been noted in a number of empirical studies (for example, Kumar 2006; Singh 2002; Swain 2011). Nor do the empiricists recognise that contract farming merely represents an intensification of a much older process of control over rural petty production by capital (for example, Balaji 1977). Though post-theoretical research is useful in describing new institutions and putting questions about agricultural commodity marketing on the policy agenda, its empiricism makes it unable to answer them with even a low level of scientific credibility. How can one account for this emerging trend in the study of agricultural marketing in India, and for that matter, around the globe? Our conjecture is that it is not (simply) the inexorable pressures of technique or data (so obvious in mainstream development economics), or the diffusion of the seat-of-pants approaches to society and policy manifest in the new “assessments” from the biophysical sciences (for example, Cardinale et al 2012). Rather this new empiricism masks the requirement of political compliance (for example, Acharya 2007). In a reversal of evidence-based norms, results then drive a mode of practice which any recourse to theorisation would betray as unscientific.

However, the long-standing and largely exclusive focus of mainstream theory on market efficiency is clearly also part of the reasons for the post-theoretical turn. Two schools of thought within mainstream economics – neoclassical and new institutional – both emphasize the efficiency role of markets and the function of prices as resource-allocation mechanisms.

Post-theoretical empiricism flourishes because there is no (mainstream) theoretical alternative. So we start by interrogating these frameworks.

MAINSTREAM MARKET ANALYSIS: EFFICIENCY TRUMPS COMPLEXITY NEOCLASSICAL ECONOMICS: INTEGRATED MARKETS, UN-INTEGRATED THEORY:

In this literature, the “market” is understood as an autonomous and flexible mechanism of voluntary exchange based on choice, a mechanism by which prices are formed as a result of supply and demand, and through which scarce resources are valued and allocated (for example, Pandya and Dholakia 1992: 24). In theoretical formulations, efficiency is achieved under perfect competition with perfect availability of information where actors “grind towards preordained equilibrium levels” (Fine 1998: 251). In models of other stylized market structures (for example, oligopoly or monopoly), certain criteria are altered, others retained and the consequences for prices and quantities are predicted. The focus of the framework is on prices and quantities, with “allocative efficiency” defined as the point of coincidence between marginal revenue and marginal cost in a deinstitutionalized production function, an ideal type from which all deviations (in oligopolistic and monopolistic models, for example) result in welfare losses (Colman and Young 1997: 50). Furthermore, the actors involved in these stylized markets are “rational individuals” who aim to maximize their utility (proxied by profit, in the case of firms, but following the same logic). Thus, apart from being the most efficient mechanism for resource allocation, the market also becomes the supreme medium for the expression of individual choice (Hodgson 1988: 178). When markets are stylised like this, the question of whether a given market is efficient reduces – as a corollary of the method – to the question of how competitive that market is –and thus to the degree to which it conforms to the neoclassical ideal of perfect competition (Crow 2001: 83). This is accomplished through tests of market integration using data from sites where prices are assumed to be determined interdependently, – that is, whether the prices of a commodity in spatially separated markets move together and price signals are transmitted smoothly through them (Ghosh 2000: 618). As a result, consumer preferences are transferred without distortion to producers who will use this price information to make allocatively efficient production decisions. In Indian marketing systems, there is a long tradition of studies that have used this approach to ascertain whether different commodity markets are integrated (for example, Basu 2006; Lele 1971; Palaksha and Harris-White 1993, 1996; Sekhar 2012). Most studies rely on commonly available secondary price data collected by government statistical departments,

which gives open market prices per unit of quantity (for example, a quintal) of, say, rice for a given form (for example, paddy), quality (for example, superfine) and variety (for example, Ponni) for a given period (say a week) in a specific location (for example, a notified marketplace). Integration tests are constructed from these. However, such acts of aggregation suffer from a number of defects. First, such data reduces the entire transactions of a settlement over a period of time to a single price (Harris-White 1995a: 302). If this is an average, it is usually from an unknown population of transactions. It masks within, period fluctuations in price due to supply and demand, variations in competitive conditions and the bargaining power of the transacting parties, as well as the existence of interlocked contracts between unequal bargaining actors (Crow 1989: 205) at local sites other than the regulated market from which the data are suggested. The data relied upon within these analyses simply do not measure up to the efficiency task they are required to accomplish. Moreover, empirical analysis has shown that prices in two separate marketplaces may move in the same direction, or even be the same, but the relationship may be one where one marketplace is where prices are formed, while the other is a dependent price taker (Palaksha and Harris-White 1996: 113). Furthermore, a theoretical leap of faith arises when the competitiveness of a market is inferred directly from the integration of prices between two spatially segmented markets; as Rudra has shown; two towns dominated by a monopolistic or oligopolistic market structure may nonetheless display uniform prices, “not even reflecting any differences due to transport or storage costs” (Rudra 1992: 43). So, to assume without more information that price movement in the same direction, or even equal prices between two marketplaces, is an indicator of a competitive market structure is quite unwarranted. Prices alone can tell us little about the reasons why a market is integrated or not. For this, data are needed on a number of other variables such as costs, trade and credit flows, alongside an analysis of government policy, marketing infrastructure, dissimilarities in production and supply shocks, all of which require extensive fieldwork to complement secondary data (Goletti and Christina-Tsigas 1995: 327). Given the grave limitations of using price data without costs for analyzing efficiency, it is a monument to human daring that they are used at all. Despite the fact that this framework is only concerned with efficiency, the manner in which efficiency is conceptualized is also narrow and reductive. Two problems can be identified within the theoretical presuppositions of neoclassical analysis of efficiency; first, perfect competition does not exist in actual markets; second, and more importantly, no institutionalized means is posited in the neoclassical model whereby supply is supplied and demand is demanded, and against which actually existing marketing systems can be evaluated. Markets exist within an

institutional complex; a theoretical framework that views these institutions as mere deviations from the norm of a perfectly competitive market is unable to grasp the role non-market institutions play in creating and sustaining markets (Ebner 2008: 12). Thus, while it is crucial to move the focus of market research from efficiency to their other functions (like exploitation and extraction; for example), even efficiency is better conceptualized within a dynamic framework which takes the actually existing institutional configuration as centrally important and evaluates it with respect to adaptation to the opportunities the institutional structure creates (North 1990: 80-82). For example, using this more flexible notion of efficiency, Harris-White showed that the mercantile firms of Coimbatore district, Tamil Nadu, minimize the costly and dependent phase of skill and contact acquisition through the use of relational and repeated transactions together with closed negotiations, leading to lower transaction costs but compromising price integration (Harris-White 1996: 312). Markets, therefore, are not reducible to price channels but are also conduits for the intersectoral transfer of resources through the distribution of savings and reinvestment of profits. They are also arenas of the exploitation of labour and of petty producers (for example, Mundle 1985). An offshoot of neoclassical economics, New Institutional (or transaction cost) Economics has recognized some of its limiting assumptions and sought to incorporate ideas of incomplete markets, uncertainty and transaction costs within its theoretical fold in order to bring the analysis closer to the situation of actual commodity markets in developing countries such as India. It is to this literature that we now turn.

NEW INSTITUTIONAL ECONOMICS: OLD WINE IN NEW BOTTLES?

The most important component of New Institutional Economics (henceforth NIE) is the analytical incorporation of institutions: market institutions are conceptualized as rational responses to the problems of organizing information, transactions and property rights, under conditions of environmental and biological lags and uncertainty, opportunistic behaviour and bounded rationality (Brousseau and Glachant 2008). Under certain conditions – either of specialization in production and marketing, and informational opacity, or of lack of specialization and underdevelopment of the information infrastructure – information may be costly to obtain, control and transfer. It may also be insufficient to enable calculations of the results of alternative actions. Information asymmetry and “impactedness” are said to lead to “opportunistic behaviour” and to high monitoring and enforcement costs. These costs are components of the broader set of transaction costs necessary to the making and protection of contracts. They include the costs of search and screening, of negotiation and transfer of

property rights, of coordination and of safeguarding (Aleem 1990; Jaffee 1994). Microeconomic institutions will reflect these costs, uncertainties and economic relations, and have been theorized as being the means of minimizing them (Bardhan 1989b; Williamson 1993). In Indian agricultural markets, NIE has been used to explain the widely observed phenomenon of “interlocked factor markets”, a situation where two markets (for example, money and produce) are locked together in an inter-temporal contract through the tying together of two distinct transactions in one deal or “contract” (Olsen 1996: 25). For example, a trader (or an agri-business) may tie a farmer through advancing credit in the form of money on condition that he sells his produce to him immediately after harvest at a pre-decided price; in this way, the contract for one exchange (of produce at a preordained price) is established as the condition for another exchange (of money). Though the initial formulations within this framework in the Indian context were in agricultural relations such as caste, class and gender, the “institutions” that NIE includes lack any structural or historical dimension. As with “markets” in neoclassical economics, “institutions” in NIE are wrenched away from their organic links to agrarian and non-agrarian property distributions, surplus extraction and power (Rao 1995: 13). Even when caste and gender are included, NIE never treats them as being of interest in and of themselves but are considered only to the extent that they reduce transaction costs. So the focus of the framework once again remains narrowly on efficient or optimal outcomes, only this time in relation to uncertainty and transaction costs. NIE, while an improvement over the neoclassical framework, is nonetheless inadequate for the purpose of explaining the multiple roles that markets play, especially those of exploitation, extraction and, ironically, self-regulation. However, Indian research grounded in classical political economy has made notable contributions to the understanding of the instituted nature of exchange and the relations between production and markets.

BROADENING THE CANVAS: THE POLITICAL ECONOMY OF EXTRACTION AND EXPLOITATION ‘MARKETS’ AS MECHANISMS FOR RESOURCE EXTRACTION:

In India, real marketing systems have also been studied by scholars of classical political economy with its commitment to an interdisciplinary agenda and a focus on the social relations of production and exchange. They have drawn attention to roles besides the securing of efficiency that agricultural commodity markets must and do play, most notably the extraction of the agrarian surplus and the exploitation of labour and petty commodity producers (Mishra 2008). Against the neoclassical conceptualization of markets as

autonomous entities, these researchers find that commodity flows and prices, the volume and seasonality of supplies and the location and number of intermediaries is not entirely independent of other parts of the economy, especially the agrarian structure (Harris-White 1996: 32). Markets are extractive mechanisms whereby resources are mobilized and transferred across sectors of the economy. Food, the basic wage good, is transferred to sectors of society that do not own food or control access to it. Raw materials are supplied to domestic industry (Harris-White 1985: 280). Mundle suggests that there are at least three different ways in which one can comprehend the manner in which resources are extracted from the countryside; first, there is simply the total amount of trade that takes place between agriculture and industry, which he calls the trade surplus; second, the net flow of funds out of agriculture in the form of private savings transfers, or the excess of government revenues collected from agriculture over and above public expenditure in agriculture. This he terms the savings surplus. Finally, there are the terms of trade, which refers to the relative prices at which agricultural products are exchanged with industrial goods (Mundle 1985: 50-51). It is in relation to this third manner of resource extraction, via the manipulation of terms of trade, that the major debates on the extractive role of markets have taken place in the Indian context.

STUDY OF MARKETABLE SURPLUS

The intellectual antecedent of the terms of trade literature in India is the study of the marketable surplus; this literature examined the ways in which supply responds to price among agricultural producers. The classic study was that of Narain, who argued that marketable surplus decreased as holding size rose towards 15 acres, after which it increased, a relation termed the U-shaped supply response (Narain 1961). Moreover, he found that the bulk of the marketable surplus was provided by smaller farmers and that larger farmers tended to retain more of their produce. This “perverse” supply response was reanalyzed by Patnaik, with the same data sources but using different size classifications, leading her to conclude that the marketed surplus increased steadily from 20% for the lowest size class of one hectare, to 63% for the highest category of 20 acres and above (Patnaik 1972). This also meant that it was larger farmers and not smaller ones, as Narain had contended, who supplied most marketable produce. Rastyannikov (1975) was also supportive of Patnaik’s claim that the amount of marketed produce increased with the size of holding, and that larger farmers were mainly responsible for the marketed surplus. In an extensive review of the literature, Nadkarni (1999) showed how the participants in these debates often operated at a highly

aggregate level, without deconstructing the concept of marketable surplus into gross and net elements. And also how they ignored the important question of where and how the returns from the marketable surplus are invested after being extracted. Field research has demonstrated that resources extracted from agriculture in the form of a marketable surplus may be ploughed back into agriculture, or invested in industry and commerce, or spent on education or conspicuous consumption, or on the maintenance of an army and bureaucracy – each of which has distinctive implications for capital accumulation and class formation (Byres 1977; Nadkarni 1980; Raj 1979). One of the key mechanisms of resource extraction, apart from the direct taxation of agriculture, is the manipulation of the intersectoral terms of trade (ToT).

The pioneering study in this regard was that of Thamarajakshi (1969), who systematically estimated the ToT for the aggregate agricultural sector in India by identifying commodities that were actually traded by the sector, and using their shares as weights to define the composite price index of prices received and prices paid by agriculture. Subsequently, Kahlon and Tyagi (1980), Tyagi (1987), Munekar (1993) and Palanivel (1997) (among others) provided estimates of agricultural ToT using alternative price data and different trading baskets. Thamarajakshi (1969, 1977), using a wholesale price index (WPI), argued that while the prices of both agricultural and industrial goods were rising in aggregate terms during the period 1951-52 to 1965-66, those received by agriculture rose faster than those paid by it, the movement of net barter ToT had registered a positive increase in favour of agriculture, while the income terms of trade had actually witnessed an even greater increase (Thamarajakshi 1969: 96-100). But Kahlon and Tyagi (1980) highlighted several methodological and empirical problems with Thamarajakshi analysis. Most significantly they argued that her use of official WPI suffers from the intractable limitations that they do not reflect the prices actually received by farmers: calculations based on farm gate prices would provide a more accurate picture of the movement in ToT. Furthermore, the list of manufactured goods quoted in WPI include many commodities that are not traded with agriculture, many “nonfood” items that, according to Kahlon and Tyagi, had witnessed a significant increase in price were omitted, thus biasing the calculation against the non-agricultural sector. They argued further that Thamarajakshi’s coverage of items was inadequate and her method of attaching equal weight to all reporting centres from where official price quotations are obtained is faulty, given that these centres trade in differing volumes of grain. This was extremely significant given the regionally concentrated nature of high value food grain, especially wheat; in fact, it was argued that the real increase in prices

was due to the disparity between deficit and surplus regions, rather than prices received by farmers. Lipton's pronouncement that India's "price twists" resulted in an "urban bias" clearly supported

Kahlon and Tyagi's position (Lipton 1977). Yet others supported Thamarajaskhi's idea that the ToT had shifted in favour of agriculture. Byres strongly rejected the claim that there was an urban bias against agriculture; indeed, he argued the opposite case, maintaining that the political power of rich peasants and medium landlords had forced the state to alter the terms in favour of agriculture, resulting in a "rural bias" (Byres 1974: 251). The classic statement in favour of this view was by Mitra (1977), who was of the view that from the mid-1960s to the mid-1970s successful lobbying by rich peasants resulted in the government setting a high price for foodgrains, especially in the wheat centres of north India (notably Punjab), leading to lower wages for industrial workers, as well as a profit squeeze within industry, while enriching the surplus-producing farmers. Other technical issues were raised on both sides of the debate, ranging from the choice of base lines, the weights attached to the two elements of the ratio, the choice of goods comprising the agricultural and non-agricultural sectors, and the source of price data (Vittal 1986: 146-47). Nonetheless, the debate highlighted the crucial role that markets play in extracting resources from and between sectors. The extractive activity of agricultural markets leads to the development of a home market, involving demand for agricultural commodities by the non-agricultural sector and vice versa; the extractive role of markets, especially through the terms of trade, continues to be of prime importance for development economics and policy (Bhaduri 2003: 223). But the computation of market prices in the form of large geographical averages hid the regionally differentiated impact of the terms of trade, since in reality different regions faced different prices (Harris 1984). More importantly, using aggregate data also masked the class-stratified nature of the rural social formation – different classes faced different ToT (Olsen 1996: 10). This brings us to the third crucial social role that agricultural commodity markets play besides efficient resource allocation and extraction of marketable surplus for reinvestment: the exploitation of labour and petty producers in agriculture and the non-farm economy and the process of class formation through exchange relations. There is a small but significant literature on this which we can now examine.

CONCLUSION

Of late, agricultural markets have become a prime case of what the anthropologist Clifford Geertz called "theoretical diffusion" (Geertz 1973). They have been conceptualized as vital

components of the rural non-farm economy (Chadha 2007: 361-62), as “services”, as “infrastructure”, as “the unorganized sector” (Joseph et al 2008), as “agri-food systems” (Frodin 2012), as “business catalysts” (Reardon and Minton 2011a), as modern terminals (Frodin 2010) and as modern retail (Reardon and Minten 2011 b). They are also seen as vertically forged into food supply or value chains (Narrod et al 2009) and as public-private, rural business hubs (Fan 2010), agro logistical networks (Goswami 2010) and growth poles (NCEUS 2009). To probe the theoretical basis (or lack of it) of each of these conceptualizations and their implications is beyond the scope of this essay. Our aim has been more modest: to provide overviews of the literature on agricultural commodity markets in India in relation to the three vital roles we think they play; and of the implications of these for the analysis of market-related policy. In an era when policy-driven writing is increasingly detached from theoretically grounded fieldwork, we hope that a new generation of researchers interested in the fascinating world of agricultural commodity markets may find such a retrospective review a valuable and even perhaps necessary starting point.

REFERENCES

- Acharya, S (2007): “Agribusiness in India: Some Facts and Emerging Issues”, Agricultural Economics Research Review, 20(1): 409-24.
- Adnan, S (1985): “Classical and Contemporary Approaches to Agrarian Capitalism”, Economic and Political Weekly, 20(30): 53-64.
- Agarwal, B (1994): *A Field of One's Own: Gender and Land Rights in South Asia* (Cambridge University Press).
- Aleem, I (1990): “Imperfect Information, Screening, and the Costs of Informal Lending: A Study of a Rural Credit Market in Pakistan”, the World Bank Economic Review, 4(3): 329-49.
- Bain, J S (1958): *Industrial Organisation* (London: Wiley).
- Banaji, J (1977): “Capitalist Domination and the Small Peasantry: Deccan Districts in the Late Nineteenth Century”, Economic & Political Weekly, 12(33/34): 1375–1404.
 - (2011a): *Theory as History: Essays on Modes of Production and Exploitation* (Chicago: Haymarket Books).

- (2011b): “Modes of Production in a Materialist Conception of History” in Theory as History:
- Essays on Modes of Production and Exploitation (Chicago: Haymarket Books).
- Bardhan, P (1983): “Labour Tying in a Poor Agrarian Economy”, Quarterly Journal of Economics, 98(3): 501-14.
 - (1989a): “Alternative Approaches to the Theory of Institutions in Economic Development” in P Bardhan (ed.), the Economic Theory of Agrarian Institutions (Oxford: Oxford University Press).
 - ed. (1989b): The Economic Theory of Agrarian Institutions (Oxford: Clarendon Press).
- Bardhan, P and A Rudra (1978): “Inter linkage of Land, Labour Relations: An Analysis of Village Survey Data in East India”, Economic & Political Weekly, 13(6): 367-84.
- Basile, E and B Harris-White (1998): “The Politics of Accumulation in Small-town India”, IDS Bulletin, 30(4): 31-38.
- Basu, J P (2006): “Co integration and Market Integration: An Application to the Potato Markets in Rural West Bengal, India”, International Association of Agricultural Economists Annual Meeting, 12-18 August, Queensland.
- Basu, K (1997): Analytical Development Economics: The Less Developed Economy Revisited (Cambridge, Massachusetts: MIT Press).
 - (2011): “Understanding Inflation and Controlling It”, Economic & Political Weekly, 46(41): 50-64.
- Bernstein, H (2010): Class Dynamics of Agrarian Change (Halifax and Winnipeg: Fern wood Publishing).
- Bhaduri, A (1973): “A Study in Agricultural Backwardness Under Semi-Feudalism”, The Economic Journal, 83(329): 120-37.
 - (1983): The Economic Structure of Backward Agriculture (London: Academic Press).
 - (1986): “Forced Commerce and Agrarian Growth”, World Development, 14(2): 267-72.

- (2003): “Structural Change and Development: The Relative Roles of Effective Demand and the Price Mechanism in a ‘Dual’ Economy” in H J Chang (ed.), *Rethinking Development Economics* (London: Anthem Press).
- Bharadwaj, K (1985): “A View on Commercialization in Indian Agriculture and the Development of Capitalism”, *Journal of Peasant Studies*, 12(4): 7-25.
- Bhattacharya, N (1985): “Lenders and Debtors: Punjab Countryside, 1880-1940”, *Studies in History*, 1(305): 305-42.
- Bose, G (1993): “Investment, Interlinked Contracts and Moral Hazard in Investment”, *Journal of Development Economics*, 41(2): 247-73.
- Boxall, R A, M Greeley, D S Tyagi, M Lipton and J Neelakanta (1977): The Prevention of Farm- Level Food Grain Storage Losses in India: A Social Cost-Benefit Analysis, IDS Research
- Reports, University of Sussex.

**A STUDY ON THE STATUS ON THE ADOPTION OF LATEST TRENDS IN THE
AGRICULTURAL AND ALLIED SECTOR FOR THE ECONOMIC
DEVELOPMENT OF KERALA WITH SPECIAL REFERENCE TO VELUR,
THRISSUR DISTRICT**

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ABSTRACT

India is an agrarian economy where most of the families practise agriculture for their livelihood. Indian farmers always face hurdles from their cradle to the grave with not even a sense of delightedness in their life due to pressures they face to run their daily routine in order to make a living. They face acute scarcity of raw materials, water, labour etc. They makes a very little or no profit at all from their severe hard work. Most of them are forced to take loans and other funds from various financial institutions and are unable to repay the same due to the excess costs and thereby the heavy losses they faces. In this context, the arrival of technology played a significant role which in turn helped to reduce the cost of production and to conduct the agricultural activities much faster than ever before. So the present study tries to pinpoint the latest agricultural tools that can be adopted by the farmers for a better standard of living.

Keywords: Agriculture, Technology, Economic Development, Farmer

INTRODUCTION

Agriculture remains one of the most important sectors of Kerala Economy. From decades, the agriculture sector is sprouting effectively in varying ways. In the place of old farming equipment's like Plough, now it is Tractors and Tillers that find place for smooth and easy conduct of agriculture works. Highly reproductive seeds, high quality fertilizers, pesticides for killing weeds etc. helped the farmers to get better yield. Due to this, agriculture products have become more marketable. Now just like all the activities, farming too has become smart. A lot of smart technologies and equipment's are used for rearing animals and also for growing seeds and are flourishing in an unprecedented rate. Due to this, a better and comfortable farming technique has emerged in the midst of the economy. As the world is

putting steps forward for the 4th Industrial Revolution, the agriculture sector too is contesting for the same in an energetic way.

AGRICULTURE IN KERALA

Popularity of Kerala falls on natural beauty it holds in its with lush green landscape, dense forest cover, abundant water bodies, long coastline and its environment friendly culture. Sectors like agriculture, fishing and forestry also form a vital part in the development of the state. But this share has been falling steadily over the years due to the low availability of land and the high cost of factors of production, excessive dependence on volatile international commodity prices and the vagaries of the monsoon. However, this sector is very significant from the point of view of rural livelihood, food security, and raw material for the food processing industries and for exports. It is this sector which gives character to the State. Plantation of cash crops, food crops, and homesteads are the predominant system of crop production in the state.

BRIEF HISTORY OF VELUR

Velur is a small village and Panchayat in Thalapilly Taluk, Thrissur district, Kerala with a population of 22,155. Other places close to Velur are Kechery, Wadakkanchery etc. It belongs to Central Kerala Division and is located 16 km towards North from district headquarters Thrissur, 7 km from Wadakkancherry and 297 km from State capital Thiruvananthapuram. This place is in the border of the Thrissur District and Palakkad District. Malayalam is the local language here. The total area comprises of 28.32 km² (10.93 sq. mi). The population of the village according to the sensex 2001 is 22,155 and the density of the same is 780/ km² (2000/sq. mi). Official Languages used are Malayalam and English. The sex ratio 0.89 ♂/♀ and has a literacy rate of 90.15%.

STATEMENT OF THE PROBLEM

The waves of agriculture in India in the past, present and in the forthcoming future cannot be wiped out by any other means. As we say that man can't eat money and it is he who should come forward and move together to bring out a fertile land. Its existence is gathering momentum day by day. One of the main reasons for the individuals to hesitate to enter into this field is due to the reduced profitability or even huge losses which one has to suffer even after working hard for months to reap their harvest. They cannot carry out a better standard of living with agriculture as their only occupation. Even then, certain people are

carrying out with the same as they don't have any other access in the form of employment for their daily bread. So there is utmost necessity to scrutinize latest agricultural techniques that can be adopted here so that there is a vital change in the mindset of the farmers and in the society as such that farming is an attractive profession and the one which adopts the same can have a better standard of living. In this scenario, the present study is planned to focus on the latest agricultural tools that can be adopted by the farmers for a better standard of living.

RATIONALE OF THE STUDY

Farming sector faces severe hurdles from decades in our country. None of the governments' were able to overcome this problem. Around 70% of the population in India relies on agriculture which is the main occupation and so the improvement of the same in one way or the other is utmost important for the smooth flow of our economy to reduce poverty and a better standard of living. At present, the usage of technology in agriculture sector has transformed the face of the agro industry as ever before. The replacement of old equipment's with sophisticated instruments has improved the productivity and overall performance of the agricultural sector. So the present study focuses on the latest agricultural tools adopted by the farmers at Velur, a small village situated in Thrissur District, Kerala.

OBJECTIVES OF THE STUDY

To analyse

- The latest sophisticated technology adopted in agriculture
- The usage of technology by the farmers of Velur
- Reasons for successful adoption of ICT in agriculture
- Awareness level of farmers in agricultural technology
- Hurdles faced by the farmers in adoption of technology
- The role of Government in bringing technology in agriculture.

SCOPE OF THE STUDY

The present study focuses on the latest agricultural practices adopted at Velur and analyses whether there is an effective usage of technology in the farming sector which in turn helps to boost the sales of the farmers. The scope of the study is limited to this village due to constraints of time.

METHODOLOGY

The study is mainly based on both primary and secondary data where primary data is collected directly from the farmers by interviewing them whereas the secondary sources are mainly from reports, newspapers and publications on the latest technological trends in agriculture etc.

TYPES OF TECHNOLOGY BASED FARMING PRACTICES

- **Smart Farming:** At present one of the common discussions among the people in the world is about IoT; i.e., Internet of Things and as such the farming sector makes use of IoT for adopting effective production strategies. The main objective of IoT is to produce healthier, better quality and comparatively low priced food products. Information communication system, scientific techniques etc. are various tools tested in the farming sector. Smart farming provides details regarding usage of sensors that helps to know the variety and value of crops, the quantum of rain required, the attack of weeds, and reduction in soil fertility. Thus it leads to high yield and flawless agricultural practices.

Benefits of smart farming: Flawless method of reduction of weeds, collection of information according to priority, forecast of farming circumstances in advance, fully automated farming techniques etc. are some of the benefits of Smart farming. As there would be reduction in the wastage of agricultural products due to smart technology, this will help to produce better yield which is the basic advantage. Another benefit is by the use of sensor. These sensors help to give correct information about how to use the fertilizers in the optimum manner without wastage. So, due to his, there won't be any unwanted usage of fertilizers. Sensors gather a lot of information about soil fertility, efficiency of fertilizers, the speed of growing plants, health of animals etc. These messages are transferred to the clouds which (computing) are far away from the farming area, and the cloud would analyse and interpret it. So the smart technology will really help to analyse what kind of seeds or farming will be suitable to which areas and so on. Also if one feels that, in a part of the farm, there is shortage of water or reduction in the fertility of the soil, IoT will detect the same and does necessary without even the knowledge of the farmer. This kind of farming is called precision farming.

Yet another advantage is the control over production. If one knows in advance about how much quantity of agriculture products will be sold out in the market, then smart farming will give the precise information of how much quantum of water and fertilizers are needed. So if the farmers carry out their production through smart technology, they can easily reduce the wastage of their products that occurs due to over production. Like this, the need of the market is scrutinised and farmers get a chance to carry out their production by analysing the need of their products in the market.

- **Services of the Satellites:** Satellites play a major role in conducting precision agriculture. Technologies like GPS, GNSS etc. will be used by the farmers in the coming decades. This helps the farmers to find out the apt place for agriculture and also their specialities. Various features like geographical textures, structure, value of land etc. can be calculated through this which in turn helps to analyse the method of irrigation to be adopted. This method is appropriate for those fields where there is shortage of water.
- **Farming Drowns:** The usage of drowns in different sectors of agriculture has now gained prominence and some of them are making use of it. In order to examine the health of the agricultural reaps, for water availability and to analyse the fertility of the sand etc., these drowns are used. The details like the correct height of a plant, size, texture, varying types of photographs of the farm field etc. are available in drowns. So it is analysed that, in the future drowns will help the agriculture sector in a very effective way and it will play a major role in converting the agriculture into a hi-tech industry. Many companies are working and specialising under this category. Ground-based and plant sensors are used to collect information about the soil and water. The sensors measure various features of the soil like texture, organic matter, salinity levels, and nutrient status. Weather stations are used to gather the appropriate weather data, which allows farmers to see how different weather patterns may affect their water and soil. Different technologies are available for irrigation too, but out of drip irrigation is the most effective which allows farmers to irrigate their land by the use of pumps and valves that can be done manually or automatically controlled.
- **Field Monitoring of rearing animals:** IoT sensors can be used for the animals to find out their present health conditions, and to preserve their body health. If the rearing animals like goat, etc. fall sick, then this disease will be spread to other cattles

and might cause everyone to get damaged. If IoT sensors are used here, the cattle rearers can easily trace out the sick animal and it can be removed, or kept out from other groups of goats thereby the productivity remain unaffected which avoids huge losses. IoT also helps to locate those animals which goes out of the group and gets isolated while rearing. So these sensors will really be a grace for the cattle rearers.

- **Smart Green House:** Now the greenhouse farming is also spread out in our society and has become a common one. Even if the climate conditions are adverse, this type of farming won't affect its production as it brings out favourable farming technologies within a glass house. In the case of normal farming, continuous concern of human beings is necessary. And as such, the time and cost involved in the same will be much more. But when we move on to smart farming through smart greenhouse technique, this problem paves the way. IoT technologies will help to control the atmospheric pressure and surroundings inside the green house in very logical and precise manner. The sensors will examine correctly and collect necessary information that is required for the growth of the plants. That means, the farmer need not worry or run for such things here and there as everything will be available under one roof.
- **MIT –Open Agriculture:** In the area of smart farming, one of the major foot prints of US is the MIT- Open Ag. (Massachusetts Institute of Technology) media labs. This programme consists of an agriculture incubator that can be kept on the table which senses out the temperature, climatic conditions, environmental changes and energy level for the growth of a plant. This incubator will collect the exact details where every plant can safely grow, in which area, climate etc. Those farmers who join in this programme will be provided with all information about how to conduct farming. This can be downloaded by the farmers from the website and can be used to reduce the temperature level and other features.

REASONS FOR THE NEED OF TECHNOLOGY IN AGRICULTURE AT VELUR

There are many solid reasons for the adoption of technology in farming at Velur village. Some of them are as follows:

- Crop productivity and efficiency will be higher when compared with old norms of farming techniques. Farmers can attain a good return on their investment due to ease of collecting data, less cost, follow-up of data input, establishment of cumulative data sets etc.

- There is shortage of water during summer season at Velur and as such the usage of technology helps to reduce usage of water, fertilizer and pesticides which in turn will help to keep the prices of food products at lower rates.
- Impact on the natural ecosystems at Velur will get reduced with adoption of ICTs.
- There would be reduction in the flow of chemicals into the rivers and groundwater.
- Safety of workers are much more when compared with other normal methods
- Adoption of robotic technology enhances reliable monitoring and efficient management of natural resources.
- There would be greater control over plant and animal production, processing, distribution and storage for the producers.
- Reduction in the contamination of food and ensures better growing conditions for the products.
- A large quantum of information is provided through sophisticated data management.
- Farmers can avail the needed data at the right time without any hindrance. Spot exchanges help farmers to find buyers at right prices which was one of the major barriers which farmers faced in finding the optimal price and its buyer.
- There is flexibility in the usage of ICT as the method is not confined to a specific crop or crop pattern.

IMPORTANCE OF FARMER EDUCATION AT VELUR

Farmers need to be educated with the latest technology, science, business management and various other skills that directly or indirectly affect the agricultural operations. Training helps farmers to incorporate the latest scientific advances and technology tools into their daily operations which in turn help to:

- Reduce the usage of water and chemicals for crops
- Increases production and thereby profits
- Helps farmers to apply the latest tools who enters for the first time in agriculture
- Make effective management of funds and discover new economic opportunities
- Use new tools and technologies to enhance operations and increase profit
- Apply scientific discoveries to improve production and marketing methods
- Helps to analyse the quality of surface and ground water and improve the same
- Helps to reduce serious and deadly accidents
- Safe usage of pesticides and fertilizers

CHALLENGES FACED BY THE FARMERS IN USING LATEST TECHNOLOGIES IN AGRICULTURE AT VELUR

- Majority of the farmers are unaware of the latest agricultural tools and equipment's that is available in the market.
- Farmers find it difficult to purchase latest agricultural tools and machines as the cost for the same is high.
- Those farmers who owns the same doesn't know its operations properly which makes the situation unfavourable.
- Due to lack of knowledge and skill in handling technology, the farmer adopts non-optimal ICT which in turn will make the situation worse than ever before leading to huge losses.
- Personal barriers of various kinds reduce the usage of ICT enabled farming among the local farmers.
- Most of the farmers are reluctant to use the latest techniques as they think that it is a waste of time and money as the introduction of a new technology to farmer's pose obstacles.
- Majority of the farmers likes to go through their normal routine while performing the works and are not interested in changing to the new methods.
- Significant experts like extension officers, scientist, consultant etc. are needed to train the farmers from the base level, which is indeed costly and to avail the same is not as easy as possible.
- Some of the farmers adopt certain software packages which includes spread sheets of Excel or dedicated software which may or may not be adequate.
- Those farmers who tried ICT in the farms have decided to quit from the same it becomes a tedious task as the same is not user- friendly and couldn't attain their specific needs.
- Farmers who are dissatisfied with this technique discourage others too for making use of the same even after installation.
- Marketing of ICT to farmers is not as easy as possible.

ROLE OF GOVERNMENT

Government must take initiative to enhance ICT enabled learning to the local farmers by providing experts in these fields. Appropriate funds must be raised by the authority to

allocate funds to the farmers for purchasing ICT equipment's. Government can also provide incentives and subsidies for those who adopt ICT enabled farming and can have tie up with MNC's and big business giants to contribute funds for the same. Also an awareness programmes to the farmers in the village on the need for entering into this field and how it benefits the society as such should also be provided for the effective functioning.

CONCLUSION

Agriculture sector plays a significant role in the process of economic development of India. It provides food to nation, labour, contributes raw materials to market of industrial goods and earns foreign exchange. Kerala is predominantly a rural economy with a large agricultural base. Nearly 50% of the state's population depends upon agriculture. It is not an easy job for the farmers of India to depend on agriculture, as it is exposed to various risks. At present, with the advancement of technology, modern farms and agricultural operations work far differently. Today's agriculture consistently uses sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology. These advanced devices and robotic systems allow farming sector to be more profitable, efficient, safer, and more environmentally friendly than ever before.

Smart farming has been started adopting by certain farmers at Velur, but majority of them are reluctant to adopt the same due to lack of fund, time and knowledge. So it is the duty of the authority to make necessary arrangements for uplifting the farmers at Velur with the latest tools which in turn reap high yields and fulfilment in the coming future.

REFERENCES

- Emerging Trends in Indian Agriculture: Ashok Gulati, Agricultural Economics Research Review, Vol. 22 July-December 2009, pg 171-184
- A Study of Recent Trends in Agriculture, Sanjay Aswale, Changes in Management Practices in Global Scenario, Volume: 1
- Analysis of Trends in India's Agricultural Growth, Elumalai Kannan and Sujata Sundaram, ISBN 978-81-7791-132-9

- Recent trends and advancements in agricultural research: An overview, Mohit Sharma and Chidanand Patil Journal of Pharmacognosy and Phytochemistry 2018; 7(2): 1906-1910
- Essay on Agricultural Marketing in India, Natasha Kwat
- https://en.wikipedia.org/wiki/Precision_agriculture
- <https://nifa.usda.gov/topic/agriculture-technology>
- https://en.wikipedia.org/wiki/Agriculture_in_India

**PADDY CULTIVATION'PROBLEMS AND PROSPECTS IN KERALA WITH
SPECIAL REFERENCE TO KUTTAADU AND PALLAKAD –A STUDY**

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ABSTRACT

Kerala is predominantly an agrarian economy. Most of the people are engaged in agriculture either as small farmers or as agricultural labours. A considerable part of the labour forces in towns and cities also finds jobs in marketing, export and other activity connected with agriculture. Paddy cultivators have been facing various problems of their paddy did not fetch the reasonable price all over the country. The fall in the price will leads to increase in the cost of cultivation, this leads to farmers to commit suicide. The number of farmers commit suicide has been increasing because of the unfavorable climate condition, low price, high cost of cultivation. The state has constantly maintained a steady influence in the field of agriculture production especially in relation to rice production.

In Kerala, Kuttanad and Palakkad known as the “Rice Bowls of Kerala,” play a dominant role in the production of paddy. Kerala Government has implemented novel schemes under food security programme for special rice production areas like Kole, Palakkad, Kuttanad, Onattukara, and Kattampalli. Kerala government is giving ample awards for promoting agriculture in Kerala. They include Karshakothama award for the best farmer in the Kerala state, Yuvakarshaka Vanitha award for the best young women farmer, Harithakeerthi award for the best farm in the state. This itself shows the importance given by the state government in agricultural sector.

This paper analysed socio economic background of the paddy cultivators in the selected villages of in Kerala and also analysed the problem of the paddy cultivators. The major causative factor identified by the social scientist is shortage of labour and low price for paddy. This paper emphasis the group management for improving the economies of paddy cultivation through better management based on low cost technology, improvement in productivity selective mechanization and cost reduction. This statement has been proved in the present study.

Key Words: Paddy, Cultivation, Prices, Labour Problem.

INTRODUCTION

Agriculture forms the back bone of Indian economy and about 70 percent of the people depend on agriculture for their livelihood. About 50 percent of our National Income is derived from the agricultural sector. Besides, its cultivation provides an employment opportunity which is very significant. In the agricultural sector, it is paddy cultivation which offers more employment opportunities as compared to other crops.

Rice cultivation is the principal activity and source of income for millions of households around the globe, and several countries of Asia and Africa are largely depending on rice as a source of earning foreign exchange and Government revenue. Rice is the second largest produced cereal in the world. Production is geographically concentrated in Western and Eastern Asia. Asia is the biggest rice producer, accounting for 90 percent of the world's production and consumption of rice. China and India, which account for more than one third of global population supply over half of the world's rice. Brazil is the most important non-Asian producer, followed by the United States. Italy ranks first in Europe.

The world's major rice- producing countries including the two most populous nations, China and India- have emphasized the importance of continuing the development of new rice varieties to guarantee Asia's food security and support the region's economic growth. Today rice is grown and harvested in every continent except Antarctica, where conditions make its growth impossible. The majority of the rice producers come from India, China, Japan, Indonesia, Thailand, Burma and Bangladesh.

Rice is India's preeminent crop, and is the staple food of the people of the eastern and southern parts of the country. Rice is one of the chief grains of India. Moreover, India has the biggest area under rice cultivation, as it is one of the principal food crops. India is one of the leading producers of this crop. Rice can be cultivated by using different methods based on the type of region. In India, the traditional methods are still in use for cultivation of paddy. The fields are initially ploughed and fertilizers are applied which typically consists of cow dung and then the field is smoothened.

The seeds are transplanted by hand and then through proper irrigation, the seeds are cultivated. Rice is grown on a variety of soils like silts, loams and gravels. In India, rice is grown under widely varying conditions of altitude and climate due to the country's large geographic size and varied topography makes it climates difficult to depend upon. The rice growing seasons vary in different parts of India, depending upon temperature, rainfall, soil type, water availability and other climatic conditions. In the eastern and southern regions of India, the mean temperature is found favorable for rice cultivation throughout the year. Hence, two or three crops of rice are grown in a year in eastern and southern states. In the northern and western parts of the country, where rainfall is high and winter temperature is fairly low, only one crop of rice is grown during the month from May to November.

Since Kerala is an industrially backward state, its economic development depends mainly on agricultural sector. In Kerala, 30 percent of the gross cropped area is occupied by rice, the staple food of Keralites. As the cost of living in Kerala depends upon the availability

and price of rice, the agricultural index of Kerala is very much affected by the ups and downs in the production of paddy. Kerala state which had a low base in food production is facing serious challenges in retaining even this meager area. The agricultural economy of Kerala is undergoing structural transformation from the mid 70's by switching over a large proportion of its traditional crop area devoted to subsistence crops like rice and tapioca to more remunerative crops like coconut, tea, spices and rubber.

A number of reasons could be attributed to this steady decline of rice growing areas. The decline in rice cultivation was due to the fall in the price of rice and the rise in the cost of cultivation. In addition to increase in cost, the non-availability of labour for agricultural operation also acts as a major constraint.

REVIEW OF LITERATURE

According to 1961 census Kerala had a population of 16.9 millions that amounted to 3.85 percent of the country's total population. In the year 1960-61 the state accounted for 2.5 percent of the total amount of rice produced inside the country. The relative shares of the state both in area and production of rice showed positive growth trends through out that decade but began to decline since the early years of the seventies. By the year 1980-81 the state's share in area under paddy and rice production declined to 2 percent and 2.37 percent respectively. As per the 1991 census the state's population increased to 29.1 millions which was 3.45 percent of the country's total population in that year. In spite of it, the percentage share of the state in area under paddy crop had decreased to 1.31 and its share in the total rice production in the country came down to 1.46 percent during the year 1990-91. Kerala's population for the year 1999 is projected as 31.98 millions which amounts to 3.26 percent of the country's total population. However, the relative shares of the state in area and production of paddy during the year 1998-99 are found to be 0.79 percent and 0.85 percent respectively. A comparison in the performance of Kerala and India in the area, production and productivity of rice during the period 1960-61.

There are plenty of studies related to the paddy cultivation in the state. Some of the literature has been reviewed here. Prabhakaran and Harikumar (2006) have revealed that Kerala's Agriculture is in crisis today. Nearly 1500 farmers have committed suicide in the last five years, mainly in Wayanad and Palakkad; the two farms dominated backward districts. In the 'Rice Bowls' of the state Palakkad and Kuttanad is an alarming decline in the extent of the area under paddy cultivation. According to the economic and statistics department, total paddy cultivation in Kerala is 3,10,521 Hectares, in Palakkad it is 1,15,910 Hectares in three seasons.

The drop in paddy cultivation is because farmers don't find it remunerative. Agriculture Department of Kerala (2007) has argued that the Wetland of Kerala is mainly used for growing paddy and for prawn culture. About 3.5 lakhs Hectares of land are used for agriculture in the state. This accounts for nearly 50 per cent of total area under wetland in the state. There are six major rice eco-systems in the state midland Malyoram Eco system,

Kuttanad Agra Eco system, Onattukara rice eco system, Pokkali rice eco system, Palakkad plain and Chittur rice eco system and high range rice eco system. Prakesh (2008) has pointed out that Palakkad district the largest paddy producing district in the state, has found that the problem faced by farmers was the acute shortage of labour and increase in the wages of farm workers.

As a major share of paddy cultivation depended on hired labour, youth especially those having school education considered the agriculture work a dirty job , Kerala University field survey report said, employment opportunities in non – agricultural sector the youth shifted that sector

SIGNIFICANCE OF THE STUDY

Palakkad district and Kuttanad is known as the granary of Kerala state. Paddy is the principle crop here and it is cultivated in three seasons viz..., autumn, winter and summer. Being one of the interior districts of the state, Palakkad is geographically unique in many aspects. The continuity of the majestic Western Ghats which stretches over 1000km is broken at Palakkad district known as Palakkad gap with a width of 3.02 km.

The climate of the district is greatly influenced by the gap, as it enables the north east winds, to blow spreading its wing throughout the breadth of the Ghats. Since the districts gets the benefit of south west and north east winds. Rainfall is heavy in both seasons and consequently Palakkad district has got extensive paddy fields and it is aptly known as the granary of Kerala. To the west this region are the plains broken here and thereby Bharathapuzha and tributaries.

There are extensive paddy fields in this track. There are neither low lying areas nor seasons embracing the district. In the present scenario it is difficult to do rice cultivation in the state due to high labour cost and shortage of labour mechanized transplanting is attracting more and more paddy farmers in Kerala. By adopting good quality seeding's, adequate use of organic manure, integrated water and pest management Kerala farmers can increase rice yield and thereby profit from it. Also paddy fields are being converted into filled up land. Paddy fields are slowly diminishing from Kerala, creating threat to food security of state. For conversion of paddy fields, Kerala government had made law to stop filling the paddy fields for uses like construction, cultivation of cash crops like rubber, coconut tree etc... There has been an unprecedented hike in the price of rice over Kerala for the last three years. Price of rice in the open market reached approximately Rs.34- 40 per kg in 2014 November.

METHODOLOGY AND SOURCE DATA

This study is mainly focused in Kerala state, the primary and secondary data are used for this study. Primary data is related with interview of the farmers. Major sources of secondary data used in this study are the publications of the State Planning Board (SPB), Department of Economics and Statistics (DES) of the state government earlier known as the Bureau of Economics and Statistics (BES), Kerala Agricultural University, Rice Research

Census Survey Reports, village office records, data collected by the krishibhavan for local level planning, research papers, articles and various Commission Reports are also used in this study.

Table.1. Area, Production and Productivity of Rice in Kerala and India

Area, Production and Productivity of Rice in Kerala and India						
Sl. No	Year	Area (000' ha.)		Production (000MT)		Productivity (kg./ha.)
		Kerala	India	Kerala	India	
1	2008-09	234.265	45600	590.241	99400	2520
2	2009-10	234.013	41920	598.339	89090	2557
3	2010-11	213.187	42560	522.738	95980	2452
4	2011-12	208.16	43970	568.993	102750	2733
5	2012-13	197.277	42410	508.299	104399	2577
6	2013-14	199.611	43900	564.325	106500	2827
7	2014-15	198.159	43860	562.092	105480	2837
8	2015-16	196.87	43500	549.275	104410	2790
9	2016-17	171.398	43190	436.483	110150	2547
10	2017-18	189.086	NA	521.31	NA	2757

Source: Directorate of Economics and Statistics, CMIE, RBI, Pocket book of Agricultural Statistics 2017

Rice is the major food crop cultivated in the State occupying 7.3 per cent of the total cultivated area. On analysing the area under cultivation for the last 10 years, the area under paddy cultivation was highest in 2008-09 recording an area of 2.34 lakh ha., which was 8.69 per cent of the total cropped area. The area under paddy cultivation in Kerala in 2017-18 was 1.94 lakh ha of which 1.89lakh ha was wetland paddy. The production in 2017-18 was 5.21 lakh tonnes which shows a decline of 11.7 per cent compared to 2008-09 levels. While the area under wetland paddy increased by 17,688 ha (10.3 per cent) over 2016-17, there is a decline of 7,784 ha (3.9 percent) compared to 2015-16.

With respect to production, an increase of 19 per cent (5.21 lakh tonnes) was recorded in 2017-18 compared to 2016-17, but a decline of 5.1 per cent when compared to 2015-16 (Figure Below). The productivity of rice had shown an increase from 2,547 kg/ha in 2016-17 to 2,757 kg/ha in 2017-18.

OBJECTIVES OF THE STUDY

1. To identify the major paddy producing areas in Kerala.
2. To analyze the problems involved in the marketing of paddy.

SCOPE OF THE STUDY

The research study is help to improve the agricultural production in Kerala. The analysis of the agricultural production is given to more importance from government policies. The research findings more helpful to the farmers in Kerala.

CAUSES FOR THE DECLINING PADDY CULTIVATION IN KERALA

The following are the important causes of the declining trend of paddy cultivation in Kerala.

1. Seasonal shortage of labour supply:-

Compared to garden crops and plantation crops, paddy cultivation is more labour intensive. It is estimated that human labour costs amount to nearly 60 percent of the total costs involved in paddy farming. Present investigation shows that household members of 60 percent of the sample farmers in the study area do not perform any sort of manual works in their fields. It is also found that 33 percent of the marginal farmers, 67 percent of the small farmers, 80 percent of the medium farmers and 83 percent of the local farmers are exclusively depending on hired human labour. According to a vast majority of paddy farmers in this area the single biggest problem they are facing is the non-availability of sufficient farm labourers during the harvesting season.

2. Small size of holdings and decline in the number of full time farmers:-

It has been pointed out that an agricultural household with 5 to 6 member needs at least 10 acres of paddy fields for its sustenance in the absence of any other source of income. However, in Kuttanad only 3 percent of the farmer households possess that much Growing aversion of new generation to paddy cultivation.

Some decades back in Kerala the upper class and middle class family is considered the ownership of paddy fields as a symbol of their social status, owners of the paddy fields commanded much social respect and acceptance. However, the present rice cultivation has lost its glamour. The new generation people from farmers households looking for the white collar job.

3. Pressure of population on land:-

There is a heavy pressure on land. In fact since the non-agricultural sectors of the economy have not been able to expand at a sufficiently rapid pace of last five decades, this pressure has continuously increased. Increasing pressure of population on land is partly responsible for the subdivision and fragmentation of small uneconomic holding is now low.

4. Inadequate irrigation facilities:-

Productivity is bound to be low in all those areas which lack irrigation facilities, and are totally dependent on rains. Palakkad is the example of this because in summer there was no irrigation facilities available in agriculture.

SUGGESTIONS

Based on the this researcher has suggested the following

1. As the shortage of labour is the primary problem in paddy cultivation, mechanization the paddy fields may help to increase the paddy cultivation.
2. Subsidized high yielding variety seeds will improve the production. Hence

both the farmers as well as government have to consider more on promoting the same in the state.

3. The farmers also have a broader look regarding the fall of paddy production and engage in paddy cultivation intensively.

CONCLUSIONS

Rice cultivation in Kerala state is falling down over a period of time. The major causative factor identified by the social scientists is labour shortage and low price of paddy. This statement has been proved in this study. Though the fertile of soil, favourable monsoon, and government policies have been helped the farmers they have not completely engaged in paddy cultivation as it requires timely manual work. This needs more human labour, which is only problem in the farmers. And hence, mechanization, or participation of human labour alone will increase the paddy production in the study area.

REFERENCES

- Indian economy - S K Misra and V K Puri, Himalayan publications
- Kerala agricultural policy in 2013
- Department of economics and statistics
- Karshiak keralam, Kerala Government agricultural website
- Mukesh K,dynamics of paddy cultivation in kerala
- P M Thomas, Problems and Prospects of Paddy Cultivation in Kuttanad Region.

AN ECONOMIC STUDY OF PADDY CULTIVATION IN UDAYARPALAYAM TALUK, ARIYALUR DISTRICT

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ABSTRACT

Agriculture is the backbone of India. In India, majority of the places are occupied by agricultural land. There is lot of people working in this sector. Paddy cultivation is the major cultivation in Agriculture sector. Rice is the staple food of the people of Tamil Nadu. Rice is cultivated throughout the country. This paper analyzed socio economic background of the paddy cultivation in Ariyalur District and also analyzed the problem of the paddy cultivators. The major causative factor identified by the social scientist is shortage of labour and low price for paddy. Factors influencing to choose the agriculture and reasons for the poor economic level of the farmers. The advanced technologies should be used in the agriculture sector to make more profits in agriculture. Thus, the farmers will be economically sound.

Keywords: Agriculture, Paddy, Cultivation, Farmers, Economic, Livelihood, Environment

INTRODUCTION

India the agrarian economy gives employment for millions of people and it plays a vital role in the development of an economy. Agriculture sector not only fulfills the food requirements for the people but also raw materials for agro based industries, such as cotton textiles, sugar, vegetable oils and food processing units. It is a source of livelihood for a majority of the population. The overall economic growth depends upon the agriculture. Improvement in the standard living of the people is possible through increase in crop production. Increasing production requires more production from a progressively diminishing natural base of land. Two, third of the world's population are engaged in agriculture activity

and supplies the primary products, which are essential for life. Agriculture is a functions of a complex interplay between the environment, technology and social institutions each acquiring its specificity as components in an interacting system over time.

LITERATURE REVIEW

Mahesh &Deepa (2016)declared that the declining trend in the area, production and productivity of paddy has the root cause of worry and are emphasized as threat to food security in India. Indian States Kerala is in big trouble and it is very difficult for the state to conserve the existing resources to future generation in this context. The significant changes in the society put pressure on the land and gradually paved the way to change the land use pattern. Scarcity of land for ever increasing demand for food, development of industrial sector, urbanization, conversion of paddy lands for non-agricultural purposes etc. contribute for the change in land use pattern of the society. The other major reasons for the changing agricultural land is found to be increasing cost of cultivation, shortage of labour, high price for input. It provides low interest loans with insurance coverage to the farmers; promote mechanization and management technique depending on the case. **Richard Paul &Radha Devi (2017)** explained the high cost of chemical and fertilizer is identified as the most important economic factor, affecting paddy cultivation. Second major problem is inadequacy of seeds. Non-availability of regional market information is ranked as the third important factor which affects paddy cultivation. Among these socio-economic problems the lack of finance is the major important factor which is ranked as fourth. Lack of modern knowledge about production of paddy cultivation and ignorance of modern methods is ranked as the fifth important factor. Lastly, absence of technical guidance is identified as the most important socio economic factor affecting paddy cultivation. **Fumitaka Shiotsu,et.al(2017)**,Organic farming has attracted attention in Indonesia because consumers increasingly prefer the putative safety and health benefits of organic farm products. Although national standards for organic farm products were established in 2002, some products sold as organic products in supermarkets do not carry the certification mark. Results revealed that government certified organic farming used originally produced cattle manure to grow organic rice. At the market, however, some “quasi-organic farming” products, which had not been given the organic farming certification, were sold as organic rice. This eventuality suggests that although organic farming has been increasing steadily in Bali, development of sustainable recycling agriculture demands technical guidance and increased publicity for organic farming, based on

national certification, to address misunderstandings and confusion about the definitions of organic farming and national standards that are transparent to producers and consumers.

RESEARCH PROBLEM

In India the magnitude and intensity of crops grown in the region depends on soil and bio climate conditions, Socio-economic status of farmers and opportunities for marketing the surplus. The growing period is variable from one agro climatic zone to other that affects the vegetative and reproductive period leading to differences in potential yield. The important factors affecting the Productivity are seeding time and method, crop establishment and climatic conditions during the growing season. Farmers generally take more than crop in a year to maximize the production and profits. The farmers, especially those with mean landholdings, feel that what they earn from paddy cultivation is not sufficient to meet even their basic needs. As poor farmers are reluctant to switch over to other activities or occupations for their livelihood they continue to be cultivators throughout their life facing the same type of problems with no let up. The problems encountered by paddy cultivators can be stated as of two types, the one relating to production and the other relating to marketing. Increased cost of inputs, low productivity, frequent monsoon failures resulting in crop loss, pest and diseases menace and inadequate Government's support are some of the problems relating to production, while forced sale to pay off loans, unremunerated prices, higher commission rates of middlemen, unethical market practices and absence of adequate market and storage facilities are a few of those relating to marketing. In India the problems of paddy producers are the same across the length and breadth of the country. But the magnitude of the problems may vary depending upon the regions they belong to and the seasons of cultivation.

Paddy is the major crop in Ariyalur District of Tamil Nadu as it occupies an area of 24,143 ha. Rice is cultivated throughout the country by small farmers including tribals to most progressive famers, there are number of traditional technologies evolved over a period of time. Rice is cultivated in an area of around 24,143 ha in Ariyalur district of Tamil Nadu under low land system of cultivation utilizing Kaveri river water and also Punnery Tank in the study area. In these areas, the agriculture is still in the hands of elders with the rich traditional knowledge of crop cultivation. A study of the paddy production by analyzing the factors of production, resource-use efficiency, impact of production factors on productivity, and describing the problems in cultivation will pave the way for increasing the productivity

by implementing the optimum utilization of resources. Hence, the present study has become essential to highlight the several dimensions of Paddy cultivation.

OBJECTIVES

The present paper mainly aims to know the Socio-economic status of farmers in the study area; to study the farm size wise cost and return structure of paddy cultivation in the study area; to explore the factors influencing paddy cultivation in the study area; to suggest suitable policy measures for strengthening paddy cultivation in the study area.

MATERIALS AND METHODS

The present study has been based on both Primary data and Secondary data. Survey Method has been adopted for the primary data collection. The primary data relating to demographic characteristics, socio-economic profiles of the sample farmers, information on component wise cost of paddy cultivation, component wise return from farming, problems faced by the farmers, the extent of awareness on farmer's practices etc. have been gathered through a well-structured interview schedule. The present study makes use of Multi Stage Random Sampling technique. In the first stage the study area Ariyalur District was chosen; then Udayarpalayam chosen as the study taluk; followed by one of representative Revenue Villages of GuruvalaparKovil, Udayarpalayam Taluk has been chosen in the Second stage. In the third stage, a total of 110 farmers consisting 40 marginal farmers; 32 small farmers and 38 large farmers were selected at randomly. The secondary data related to paddy cultivation statistics have been gathered from the, Govt. Reports, Journals and websites have also been used.

Table: 1 - Socio-Economic Status of Respondents

Socio-Economic Status	No. of Respondents	(%)
AGE		
Less than 30	30	27.27
31 to 40	36	32.73
41 to 50	23	20.91
51 above	21	19.09
GENDER		
Male	94	85.45
Female	16	14.55
RELIGION		
Hindu	94	85.45

Christian	16	14.55
COMMUNITY		
OC	3	02.73
BC	12	10.91
MBC	37	33.64
SC	34	30.90
ST	24	21.82
TYPES OF FAMILY		
Joint Family	8	7.27
Nuclear Family	102	92.73
MARITAL STATUS		
Married	107	97.27
Un-Married	-	-
Widow	3	2.73
EDUCATION		
Illiterate	41	37.27
Primary	19	17.27
Secondary	38	34.55
Higher Sec. Education	9	8.18
Higher Education	3	2.72
OCCUPATION		
Agriculture	42	38.18
Agri. cum Daily Labour	57	46.36
Agri. cum Business	4	3.64
Agri. cum Employment	13	11.82
NATURE OF HOUSE		
Thatched	12	10.91
Tiled	14	12.73
Terraced	46	41.82
Colony	38	34.54
INCOME		
Agriculture	42	35.74
Agri. Cum Labour	51	42.12
Agri. CumBusiness	4	05.41
Agri. CumFriends, Relatives	13	16.72
EXPENDITURE		
Food items	110	100
Non-food Items	110	100
Source: Primary Data		

RESULTS AND DISCUSSION

The above table-1 shows the socio-economicstatus is the combination of factors such as religion, caste, family structure, marital status, size of family and age, while economic environment is made up of factors such as education, occupation, income and Expenditure.From the analysis the majority of the farmers 93.64% are male and only 6.36

%are female. Majority of the farmers 32.73% are young age, 27.27 % are less than 30 years, 20.91% are 41 to 50 years and 19.09 % are 51 above age groups. Only two religions are found so the respondents are classified under two different categories viz. Hindu and Christian. The marital status-wise classification of sample in which 97.27% respondents are married and 2.73% respondents are widow and none of the respondents belong to unmarried category. Thus it is found that majority of 97.28 % of respondents are married. Also it was found that the 12 (10.91) percent of respondents live in thatched houses, 14 (12.73%) respondent live in tiled houses and 38 (34.54%) respondent live in colony houses. Majority of them i.e. 41.82% respondents live in terraced houses and only 12. The sample farmers 85.45% are Hindu followed by 16 sample farmers 14.55% are Christian community. In all the farm groups the Hindu religion primarily dominates in the study area. The nuclear family which accounts to 92.73% and the joint family they contribute about 7.27 %. Majority of the respondents belongs to nuclear family system. It is interesting to note that about 2.72% have undergone higher education. Most of the household are primary occupation agriculture related activities. Regarding source with income of sample respondents in the category of agriculture cum labour have 42.12 percent income and 5.41 percent have under the category of agriculture cum business.

Table: 2- Component wise Cost of Cultivation

S.No	Cost of cultivation	Amount	%
1.	Land preparation	600	2.70
2.	Seed cost	1500	6.76
3.	Sowing cost	600	2.70
4.	Main field preparation	1800	8.11
5.	Transplantation cost	3200	14.41
6.	Fertilizer cost	2500	11.26
7.	Weeding cost	2400	10.36
8.	Pesticides Cost	1700	7.66
9.	Plant protection	900	4.05
10.	Irrigation cost	600	2.70
11.	Harvesting cost	1000	2.70
12.	Threshing cost	600	2.70
13.	Marketing cost	500	2.25
14.	Soil Conservation Cost	600	2.70
15.	Other cost	4200	18.92

Source: Primary Data

Chart-1

Component wise Cost of Cultivation

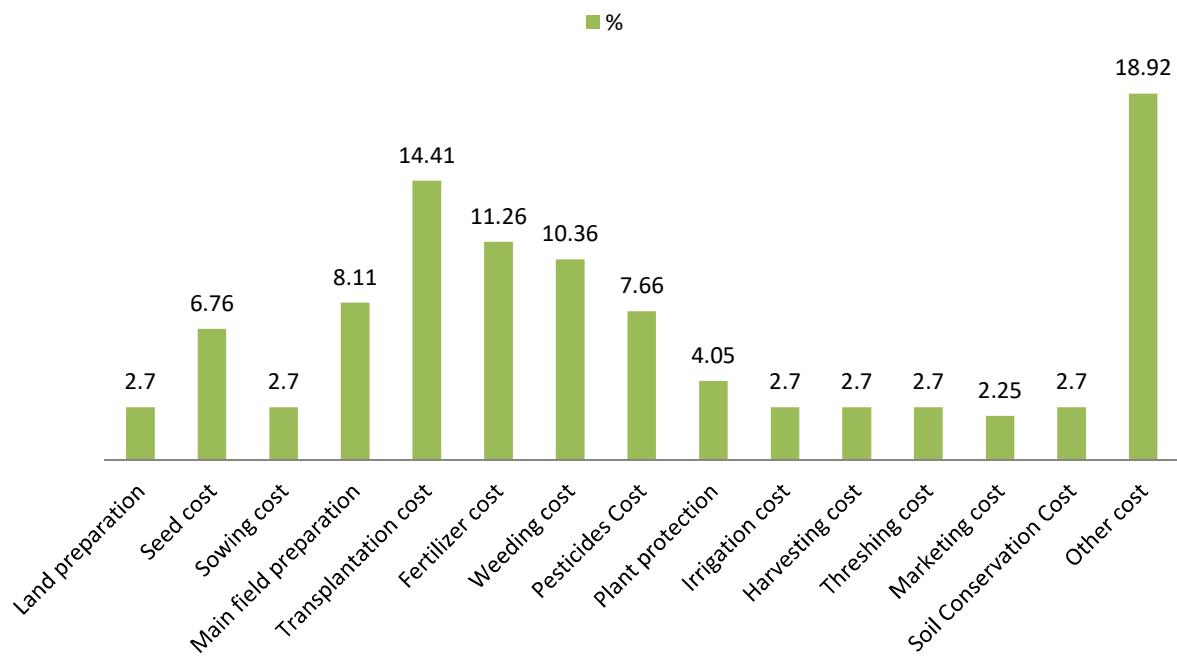


Table: 3 - Component and Farm size wise cost of Cultivation

S.No	Cost of cultivation	Marginal Farmer	Small Farmer	Large Farmer	Total	%
1.	NurseryLand preparation	24000	19200	22800	66000	2.70
2.	Seed cost	60000	48000	57000	165000	6.76
3.	Sowing cost	24000	19200	22800	66000	2.70
4.	Main field preparation	72000	57600	68400	198000	8.11
5.	Transplantation	128000	102400	121600	352000	14.41
6.	Fertilizer cost	100000	80000	95000	275000	11.26
7.	Weeding cost	96000	76800	91200	264000	10.36
8.	Pesticides Cost	68000	54400	64600	187000	7.66
9.	Plant protection	36000	28800	34200	99000	4.05
10.	Irrigation cost	24000	19200	22800	66000	2.70
11.	Harvesting cost	40000	32000	380000	452000	2.70
12.	Threshing cost	24000	19200	22800	66000	2.70
13.	Marketing cost	20000	16000	19000	55000	2.25
14.	Soil Conservation	24000	19200	22800	66000	2.70

	Cost					
15.	Other cost	168000	134400	159600	462000	18.92

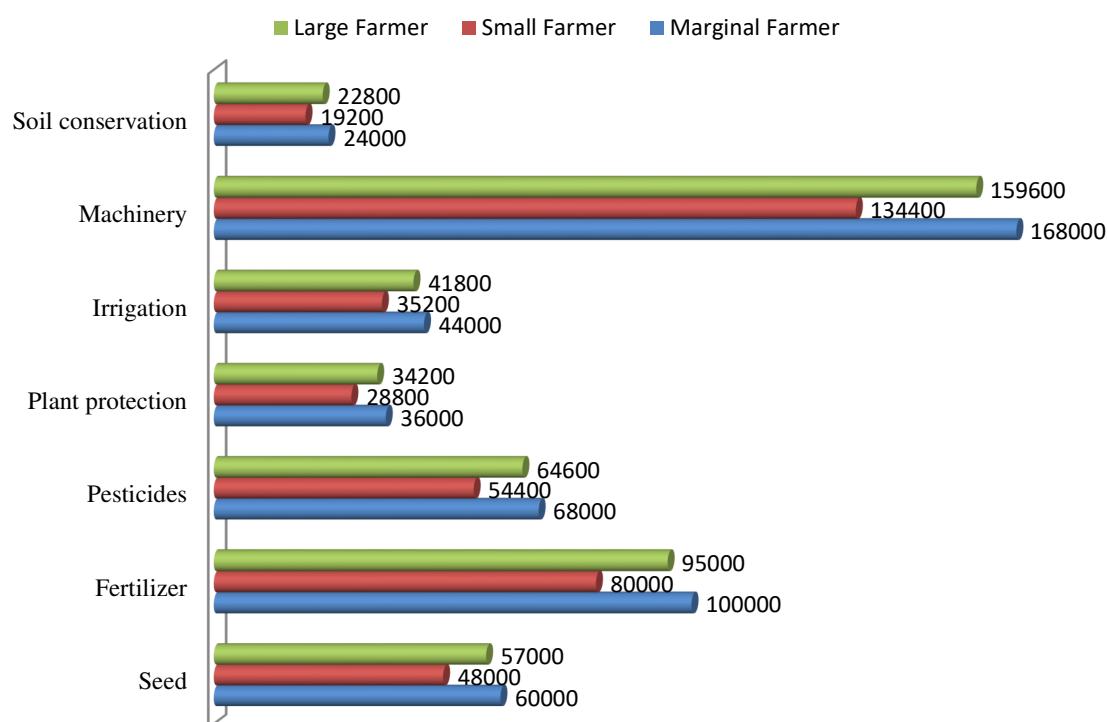
Source: Primary Data

Table: 4 - Farm size - wise Input

S.No	Input Details	Marginal Farmer	Small Farmer	Large Farmer	Total	%
1.	Seed	60000	48000	57000	165000	12.00
2.	Fertilizer	100000	80000	95000	275000	20.50
3.	Pesticides	68000	54400	64600	187000	13.6
4.	Plant protection	36000	28800	34200	99000	7.2
5.	Irrigation	44000	35200	41800	121000	8.8
6.	Machinery	168000	134400	159600	462000	33.6
7.	Soil conservation	24000	19200	22800	66000	4.8

Source: Primary Data

**Chart-2
Farm size - wise Input**



It is found that the cost of various inputs used for paddy cultivation. Among the costs, farmers spent more on harvesting by using machines which accounts 2.70 percent which is followed by transplantation cost 14.41 percent. Next farmers spent 11.26, 10.36 and 7.66 percent on fertilizers, weeding and pesticides. It is further found that regarding the components wise cost of cultivation. The amounts used for nursery land preparation and sowing cost are Rs.600 and the amount used for plant protection and irrigation is Rs.900 and Rs.600. The percentage of machinery that is used as major input is 33.6 and the percentage used for pesticides, fertilizers and seed are 13.6, 20.50 and 12.00. . From the analysis female take major role in paddy cultivation through transplanting and weeding work. Male labour are more employed for nurse pulling.

SUGGESTIONS

An affordable amount of investment should be made on agriculture sector. Agriculture planning must give importance to public sector investment in agriculture. The existing resources are not being properly maintained that leads to underutilization of resources. Due to poor knowledge about natural conservation over exploitation of resources are made. Water body structure maintenance must be given priority. Local water bodies like wells and canal must be maintained well. Farmers lack knowledge on fertilizers it leads to over use of nitrogen fertilizer and limited doses of other fertilizers like phosphatic and potash fertilizers. Balanced use of fertilizers is pivotal for a successful agriculture program. SRI – System of Rice Intensification is an efficient technique practiced in developed countries it is a cost effective method. Extension services should be extended for helping the marginal farmers. The high yielding varieties have now come to a level of saturation level it has to be overcome. Post harvest technology must be improved and value addition product is given priority. The supply chain must be flexible and extended to make it available for terminal markets. The terminal markets should be connected regionally and regional markets are connected to state to make the goods flow easy.

CONCLUSION

An attempt is made to study the economics of paddy cultivation in Guruvalapparkovil village in Udayarpalayamtaluk. The practices and operation of paddy cultivation has many problems involved that have been discussed. The cost of cultivation varies from farmers to farmers based on farm land, season, varieties and crop involved. Hence an attempt is made to study the variation in cost and to identify. The paddy cultivation in this area has a wider scope and opportunity in future, if the government and the paddy cultivars long view to increase the paddy production in this block. This area has problem of shortage of labour and mechanization. Mechanization will increase paddy production. The price of paddy to be increased at the reasonable level which makes the farmers to cultivate paddy to a greater extend. Finally the agriculture development is predicted by improvement in farm production and productivity, better utilization of agriculture inputs, proper marketing infrastructure and support, investment in agriculture with environment concerns.

REFERENCES

- Anitha Jose S. (2014), "An Economic study of Paddy Cultivation in Kanyakumari District", International Journal of ResearchGranthaalayah ISSN- 2350-0530.
- Ansari. A.A and S. A. Ismail, "Paddy Cultivation in Sodic Soil through Vermitech", International Journal of Sustainable Crop Production, Vol.3 (5) August 2008, pp. 123-139.
- Davidson B.R. and B.R. Martin, "The Relationship between yields on Farms and in Experiments", Australian Journal of Agricultural Economics, vol.9, No. 2, December 1965, pp. 129-1490.
- Diwakar, M.C., Viswanath, "Integratrd pest management for sustainable agriculture in India- an overview", Plant protection Bulletin, Faridabad, 2003, Vol.54 (1/4), pp1-5.
- Egharevba, R.K. and Iweze, F.A., "Sustainable agriculture and rural women: Crop production and accompanied health hazards on women farmers in six rural communities in Edo state Nigeria", Journal of sustainable agriculture, 2004, Vol. 24(1), pp39-51.
- Fale, J.B. G.G. Jahakare and S.G. Bourde, "An Economic Analysis of Yield Gap in Rice in Retnagiri District", Agricultural Situation in India. Vol. 39, No. 2, 1985, pp. 925-930.

- Shanmugam, T.R., "Measurement of technical efficiency in rice production", Margin.". 1994.Vol.26 Pp756-762.
- Mala. P, "Fertilizer Scenario in India", Indian Research Journals, January 2013 Vol.No.2(1).
- Desai, R.G. Agricultural Economics, Himalaya Publishing House, Mumbai-2010.

A CONCEPTUAL STUDY ON THE STATUS OF AGRICULTURE IN INDIA

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ABSTRACT

Agriculture sector is the mainstay of the Indian economy, contributing about 15 per cent of national Gross Domestic Product (GDP) and more importantly, about half of India's population is wholly or significantly dependent on agriculture and allied activities for their livelihood. Indian agriculture is a miscellaneous and extensive sector involving a large number of actors. India has one of the largest and institutionally most complex agricultural research systems in the world. The agricultural research system in India includes some 27,500 scientists and more than one lakh supporting staff actively engaged in agricultural research, which makes it probably the largest research system in the world. Although agriculture has been playing the most vital role in Indian economy, during the course of the study, it has been observed that not much emphasis has been given to the history of evolution of agricultural research in India. Keeping in above backdrop, the present study makes an analysis of agriculture sector in Indian economy.

Keywords: Indian Agriculture, GDP, employment

INTRODUCTION

The history of Agriculture in India dates back to Indus Valley Civilization and even before that in some places of Southern India. India ranks second worldwide in farm outputs. As per 2018, agriculture employed 50% of the Indian work force and contributed 17-18% to country's GDP.

In 2016, agriculture and allied sectors like animal husbandry, forestry and fisheries accounted for 15.4% of the GDP (gross domestic product) with about 31% of the workforce in 2014. India ranks first in the world with highest net cropped area followed by US and China. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India.

India exported \$38 billion worth of agricultural products in 2013, making it the seventh largest agricultural exporter worldwide and the sixth largest net exporter. Most of its

agriculture exports serve developing and least developed nations. Indian agricultural/horticultural and processed foods are exported to more than 120 countries, primarily to the Japan, Southeast Asia, SAARC countries, the European Union and the United States.

Agriculture is the primary source of livelihood for about 58 per cent of India's population. Gross Value Added by agriculture, forestry and fishing is estimated at Rs 18.53 trillion (US\$ 271.00 billion) in FY18.

The Indian food industry is poised for huge growth, increasing its contribution to world food trade every year due to its immense potential for value addition, particularly within the food processing industry. The Indian food and grocery market is the world's sixth largest, with retail contributing 70 per cent of the sales. The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 8.80 and 8.39 per cent of Gross Value Added (GVA) in Manufacturing and Agriculture respectively, 13 per cent of India's exports and six per cent of total industrial investment.

OBJECTIVES OF THE STUDY

1. To know the history of agriculture in India.
2. To understand the market size of agriculture in India.
3. To know the current status of FDI in India's agriculture sector.
4. To know the present status of agriculture sector in India.
5. To know the problems of agriculture in India.

HISTORY

Vedic literature provides some of the earliest written record of agriculture in India. Rigveda hymns, for example, describes plowing, fallowing, irrigation, fruit and vegetable cultivation. Other historical evidence suggests rice and cotton were cultivated in the Indus Valley, and plowing patterns from the Bronze Age have been excavated at Kalibangan in Rajasthan. Bhumivargaha, an Indian Sanskrit text, suggested to be 2500 years old, classifies agricultural land into 12 categories. Some archaeologists believe that rice was a domesticated crop along the banks of the river Ganges in the sixth millennium BC. So were species of winter cereals (barley, oats, and wheat) and legumes (lentil and chickpea) grown in northwest India before the sixth millennium BC. Other crops cultivated in India 3000 to 6000 years ago, include sesame, linseed, safflower, mustard, castor, mung bean, black gram, horse gram, pigeon pea, field pea, grass pea (khesari), fenugreek, cotton, jujube, grapes, dates, jack fruit, mango, mulberry, and black plum[citation needed]. Indians might have domesticated buffalo (the river type) 5000 years ago.

According to some scientists agriculture was widespread in the Indian peninsula, 10000–3000 years ago, well beyond the fertile plains of the north. For example, one study reports 12 sites in the southern Indian states of Tamil Nadu, Andhra Pradesh and Karnataka providing clear evidence of agriculture of pulses and millet-grasses, wheat, barley, hyacinth bean, pearl millet, finger millet, cotton, linseed as well as gathered fruits of Ziziphus and two Cucurbitaceae.

Some claim Indian agriculture began by 9000 BC as a result of early cultivation of plants, and domestication of crops and animals. Settled life soon followed with implements and techniques being developed for agriculture. Double monsoons led to two harvests being reaped in one year. Indian products soon reached trading networks and foreign crops were introduced. Plants and animals considered essential to survival by the Indians came to be worshiped and venerated.

The middle ages saw irrigation channels reach a new level of sophistication, and Indian crops affected the economies of other regions of the world under Islamic patronage. Land and water management systems were developed with an aim of providing uniform growth.

Despite some stagnation during the later modern era the independent Republic of India was able to develop a comprehensive agricultural programme.

MARKET SIZE

During 2017-18 crop year, food grain production is estimated at record 284.83 million tonnes. In 2018-19, Government of India is targeting food grain production of 285.2 million tonnes. Milk production was estimated at 165.4 million tonnes during FY17, while meat production was 7.4 million tonnes. As of September 2018, total area sown with kharif crops in India reached 105.78 million hectares.

India is the second largest fruit producer in the world. Production of horticulture crops is estimated at record 314.7 million tonnes (mt) in 2018-19 as per third advance estimates.

Total agricultural exports from India grew at a CAGR of 16.45 per cent over FY10-18 to reach US\$ 38.21 billion in FY18. In FY2019 agriculture exports were US\$ 38.54 billion. India is also the largest producer, consumer and exporter of spices and spice products. Spice exports from India reached US\$ 3.1 billion in 2017-18. Tea exports from India reached a 36 year high of 240.68 million kgs in CY 2017 while coffee exports reached record 395,000 tonnes in 2017-18.

Food & Grocery retail market in India was worth US\$ 380 billion in 2017.

INVESTMENTS

According to the Department for Promotion of Industry and Internal Trade (DPIIT), the Indian food processing industry has cumulatively attracted Foreign Direct Investment (FDI) equity inflow of about US\$ 9.08 billion between April 2000 and March 2019.

Some major investments and developments in agriculture are as follows:

- Investments worth Rs 8,500 crore (US\$ 1.19 billion) have been announced in India for ethanol production.
- By early 2019, India will start exporting sugar to China.
- The first mega food park in Rajasthan was inaugurated in March 2018.
- Agrifood start-ups in India received funding of US\$ 1.66 billion between 2013-17 in 558 deals.
- In 2017, agriculture sector in India witnessed 18 M&A deals worth US\$ 251 million.

GROWTH IN INDIAN AGRICULTURE SECTOR

1. Gross Value Added by agriculture, forestry and fishing is estimated at Rs 17.67 trillion (US\$ 274.23 billion) in FY18
2. Agriculture and allied sector's GVA at constant 2011-12 prices grew a CAGR of 2.75 per cent between FY12-18.
3. Agriculture is the primary source of livelihood for about 58 per cent of India's population.
4. As per Union Budget 2018-19, allocation of Rs 57,600 crore (US\$ 8.9 billion) was made for The Agriculture Ministry.
5. As per Union Budget 2018-19, the farm credit is likely to be raised to INR 11 lakh crore (US\$ 170.74 billion).
6. Cotton production in India is expected to increase 9.3 per cent to 37.7 million bales in 2017-18.
7. Sugar production in India is expected to reach 27.2 million tonnes in 2017-18 season (October-September).

GOVERNMENT INITIATIVES

Some of the recent major government initiatives in the sector are as follows:

- Prime Minister of India, launched the Pradhan Mantri Kisan Samman Nidhi Yojana (PM-Kisan) and transferred Rs 2,021 crore (US\$ 284.48 million) to the bank accounts of more than 10 million beneficiaries on February 24, 2019.
- The Government of India has come out with the Transport and Marketing Assistance (TMA) scheme to provide financial assistance for transport and marketing of agriculture products in order to boost agriculture exports.
- The Agriculture Export Policy, 2018 was approved by Government of India in December 2018. The new policy aims to increase India's agricultural exports to US\$ 60 billion by 2022 and US\$ 100 billion in the next few years with a stable trade policy regime.
- In September 2018, the Government of India announced Rs 15,053 crore (US\$ 2.25 billion) procurement policy named 'Pradhan Mantri Annadata Aay SanraksHan

Abhiyan' (PM-AASHA), under which states can decide the compensation scheme and can also partner with private agencies to ensure fair prices for farmers in the country.

- In September 2018, the Cabinet Committee on Economic Affairs (CCEA) approved a Rs 5,500 crore (US\$ 820.41 million) assistance package for the sugar industry in India.
- The Government of India is going to provide Rs 2,000 crore (US\$ 306.29 million) for computerisation of Primary Agricultural Credit Society (PACS) to ensure cooperatives are benefitted through digital technology.
- With an aim to boost innovation and entrepreneurship in agriculture, the Government of India is introducing a new AGRI-UDAAN programme to mentor start-ups and to enable them to connect with potential investors.
- The Government of India has launched the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) with an investment of Rs 50,000 crore (US\$ 7.7 billion) aimed at development of irrigation sources for providing a permanent solution from drought.
- The Government of India plans to triple the capacity of food processing sector in India from the current 10 per cent of agriculture produce and has also committed Rs 6,000 crore (US\$ 936.38 billion) as investments for mega food parks in the country, as a part of the Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters (SAMPADA).
- The Government of India has allowed 100 per cent FDI in marketing of food products and in food product e-commerce under the automatic route.

ACHIEVEMENTS IN THE SECTOR

- Sugar production in India has reached 27.35 million tonnes (MT) in 2018-19 sugar season, as of March 15 2019, according to the Indian Sugar Mills Association (ISMA).
- The Electronic National Agriculture Market (eNAM) was launched in April 2016 to create a unified national market for agricultural commodities by networking existing APMCs. Up to May 2018, 9.87 million farmers, 109,725 traders were registered on the e-NAM platform. 585 mandis in India have been linked while 415 additional mandis will be linked in 2018-19 and 2019-20.
- Agriculture storage capacity in India increased at 4 per cent CAGR between 2014-17 to reach 131.8 million metric tonnes.
- Coffee exports reached record 395,000 tonnes in 2017-18.
- Between 2014-18, 10,000 clusters were approved under the Paramparagat Krishi Vikas Yojana (PKVY).
- Between 2014-15 and 2017-18 (up to December 2017), capacity of 2.3 million metric tonnes was added in godowns while steel silos with a capacity of 625,000 were also created during the same period.
- Around 100 million Soil Health Cards (SHCs) have been distributed in the country during 2015-17 and a soil health mobile app has been launched to help Indian farmers.

Gross Value Added By Agriculture and Allied Sectors (US\$ bn)

FY	GROSS VALUE IN US\$ BN
FY 12	233.04
FY13	236.51
FY 14	249.68
FY 15	249.21
FY 16	266.48
FY 17	279.76
FY 18	271.0

MAJOR PROBLEMS OF INDIAN AGRICULTURE

The following points are the major problems of Indian agriculture.

1. Instability:

Agriculture in India largely depends on monsoon. As a result, production of food-grains fluctuates year after year. A year of abundant output of cereals is often followed by a year of acute shortage.

2. Cropping Pattern:

The crops that are grown in India are divided into two broad categories: food crops and non-food crops. While the former comprise food-grains, sugarcane and other beverages, the latter includes different kinds of fibres and oilseeds.

3. Land Ownership:

Although the ownership of agricultural land in India is fairly widely distributed, there is some degree of concentration of land holding. Inequality in land distribution is also due to the fact that there are frequent changes in land ownership in India. It is believed that large parcels of land in India are owned by a relatively small section of the rich farmers, landlords and money-lenders, while the vast majority of farmers own very little amount of land, or no land at all.

Moreover, most holdings are small and uneconomic. So the advantages of large-scale farming cannot be derived and cost per unit with ‘uneconomic’ holdings is high, output per hectare is low. As a result peasants cannot generate sufficient marketable surplus. So they are not only poor but are often in debt.

4. Sub-Division and Fragmentation of Holding:

Due to the growth of population and breakdown of the joint family system, there has occurred continuous sub-division of agricultural land into smaller and smaller plots. At times small farmers are forced to sell a portion of their land to repay their debt. This creates further sub-division of land.

5. Land Tenure:

The land tenure system of India is also far from perfect. In the pre-independence period, most tenants suffered from insecurity of tenancy. They could be evicted any time. However, various steps have been taken after Independence to provide security of tenancy.

6. Conditions of Agricultural Labourers:

The conditions of most agricultural labourers in India are far from satisfactory. There is also the problem of surplus labour or disguised unemployment. This pushes the wage rates below the subsistence levels.

7. Other Problems:

There are various other problems of Indian agriculture.

These are related to:

- i) The systems and techniques of farming,
- ii) The marketing of agricultural products and
- iii) The indebtedness of the farmers.

REFERENCES

- Chand, Ramesh, P A Lakshmi Prasanna and Aruna Singh (2011), “Farm Size and Productivity: Understanding the Strengths of Smallholders and Improving Their Livelihoods”, Economic and Political Weekly, Vol. XLVI, No. 26 & 27, June 25, pp: 5-11.
- CSO (2011), “Revised Estimates of Annual National Income 2010-11 and Quarterly Estimates of Gross Domestic Product, 2010-11”, Central Statistics Office (CSO), Ministry of Statistics and Programme Implementation, Govt. of India, New Delhi.
- Prabu , M.J. (2010). Integrated farming can alone help farmers, Survey of Indian agriculture, The Hindu, pp-18-19.
- Economic Survey, Government of India, New Delhi, www.indiabudget.nic.in
- <http://planningcommission.nic.in>
- Ministry of Agriculture , Agricultural Statistics at a Glance, Government of India, New Delhi.
- Vyas, V S (2003), “India’s Agrarian Structure, Economic Policies and Sustainable Development: Variations on a Theme”, Academic Foundation, New Delhi.

INDIAN AGRICULTURE-GROWTH, IMPORTANCE AND CHALLENGES

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ABSTRACT

Agriculture is an important sector in India. It is indispensable for the sustenance and growth of the Indian economy. On an average, about 70% of the households and 10% of the urban population is dependent on agriculture as their source of livelihood. Today, India is a major supplier of several agricultural commodities like tea, coffee, rice, spices, oil meals, fresh fruits, fresh vegetables, meat and its preparations and marine products to the international market. India is a large producer of several agricultural products. In terms of quantity of production, India is the top producer in the world in milk, and second largest in wheat and rice. Agricultural production is prone to several risks which affect both producers and consumers. In order to enhance investment and achieve a sustained increase in production, coherent and integrated long-term strategies and policies are required to reduce risk aversion and build flexibility among Indian rural producers. There is a need to provide remunerative prices for farmers in order to increase the incomes of farmers. In this research paper researcher's objective is to study the major agriculture crops production, export and import of agriculture crop wheat. A researcher also does there analytical study of this major agriculture crop Wheat.

Keywords: Agriculture, production, income, Indian economy, role, development

INTRODUCTION

Agriculture is the primary source of livelihood for about 58 per cent of India's population. Gross Value Added by agriculture, forestry and fishing is estimated at Rs 18.53 trillion (US\$ 271.00 billion) in FY18.

The Indian food industry is poised for huge growth, increasing its contribution to world food trade every year due to its immense potential for value addition, particularly within the food processing industry. The Indian food and grocery market is the world's sixth largest, with retail contributing 70 per cent of the sales. The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 8.80 and 8.39 per cent of Gross Value Added (GVA) in Manufacturing

and Agriculture respectively, 13 per cent of India's exports and six per cent of total industrial investment.

Importance of Agriculture in India is realized by everyone when Mr. Lal Bahadur Shastri, the second prime minister of India had given the slogan of 'Jai Jawan Jai Kisan'. India is the country of farmers and orchards. Most of the people of India have adopted Agriculture for their occupation. There are several acres of land which are used only for the cultivation of different crops like tomato, potato, rice, wheat, sugarcane, apples, etc. That is why Agriculture is good to take as a profession.

Some of the population is there who do not consider agriculture a reputed profession. This is really shameful thinking. You can live without other things like mobile, internet and computers but not without food. So, this is the field where if you also are working then it also means you're working for the country and own family.

OBJECTIVES OF THE STUDY

- To determine the current status of agriculture in India.
- To elaborate the role and importance of agriculture in India economy.
- To identify and overcome the challenges of agriculture in Indian economy.
- To suggest the remedial measures and highlight various opportunities for Indian agriculture sector.

RESEARCH METHODOLOGY

The study is primarily based upon the secondary data. The research for this paper was conducted through literature review, without any empirical work being conducted. The Secondary data is collected from related journals, articles, official websites, and government reports in order to analyze the context.

AGRICULTURE IN INDIA TODAY

The current status of agriculture in India today is very satisfactory. Today people are taking an interest in farming. Many of the youngsters are setting examples by using technology to make this Horticulture field more prestigious. Recently the mega agri-summit held in Rajasthan in November 2016 shows that how the government, as well as people, is keen interested in farming. The good farmers are awarded to expose & promote the Agriculture sector. Several schemes are launched to help the people to make future in agriculture, like Krishonnati Yojna, Rashtriya Pashudhan Vikas Yojna, etc. Recently a 24-hour television channel named DD Kisan also launched for Indian farmers. This channel helps in sorting out any kind of agricultural problems of the farmers.

AGRICULTURE IN INDIAN ECONOMY

India is an agriculture based country, where more than 50% of population is depend on agriculture. This structures the main source of income. The commitment of agribusiness in

the national income in India is all the more, subsequently, it is said that agriculture in India is a backbone for Indian Economy. The contribution of agriculture in the initial two decades towards the total national output is between 48% and 60%. In the year 2001-2002, this contribution declined to just around 26%. The aggregate Share of Agriculture and Allied Sectors, Including agribusiness, domesticated animals, and ranger service and fishery sub segments as far as rate of GDP is 13.9 percent during 2013- 14 at 2004-05 prices. Agricultural exports constitute a fifth of the total exports of the country. In perspective of the overwhelming position of the Agricultural Sector, gathering and support of Agricultural Statistics expect incredible significance.

According to the fourth Advance Estimates of Production of food grains for 2013-14, aggregate food grain production is assessed to be 264.77 million tons (MT).

Export of spices from India are relied upon to reach US\$ 3 billion by 2016-17, on the back of imaginative promoting strategies, inventive bundling, quality in quality and an in number appropriation system. The Indian flavors business is pegged at Rs 40,000 crore (US\$ 6.42 billion) every year, of which the marked portion represents 15% .

The National Food Security Mission (NFSM) was launched from Rabi, 2007-08. The fundamental targets of the National Food Security Mission (NFSM) is to expand production of rice, wheat, pulses and coarse cereals through region extension and efficiency upgrade in a supportable way in the recognized locale of the nation; restoring soil ripeness and profitability at the individual ranch level; and improving farm level economy (i.e. ranch benefits) to restore confidence amongst the farmers. The Mission met with a staggering achievement and accomplished the focused on extra generation of rice, wheat and heartbeats. The Mission is being kept amid Twelfth Five Year Plan with new focuses of extra generation of sustenance grains of 25 million tons including 10 million tons of rice, 8 million tons of wheat, 4 million tons of pulses and 3 million tons of coarse cereals by the end of twelfth five year plan .

Training is an important procedure of capacity building of people as to enhance the execution. Consequently, training needs appraisal is imperative to the training process. It serves to recognize present issues and future difficulties to be met through training and improvement. It is obliged to figure out the needs of individual trainee on which proficient skills ought to be assembled to do the relegated occupation in the associations .

The 6% of agricultural production is converted in to processed food, which is focused to achieve 20% in coming future. The business is work escalated and contributes around 50% for industrial production. Multi- National Food Companies have assumed a part of making business sector draw and rivalry. Selection of inventive and experimental bundling strategies by food industry has empowered the assembling of sheltered and quality sustenance .

ROLE OF AGRICULTURE IN INDIAN ECONOMY

The importance of agriculture in economic development is huge. The Agriculture sector plays a vital role in the Indian Economy. Agriculture contributes about 16% of total GDP. India exports a large number of agricultural materials like fruits, vegetables, pulses, tea, spices, etc and the government is acquiring good revenue from it. There are many exporting products in which India is leading the world like tea etc. So, it is also making India proud in the sector of agriculture. Most of the part of the money circulates for the food items purchasing which is good for financial growth and balance.

1. Contribution to National Income: From the very beginning, agriculture is contributing a major portion to our national income. In 1950-51, agriculture and allied activities contributed about 59 per cent of the total national income. Although the share of agriculture has been declining gradually with the growth of other sectors but the share still remained very high as compared to that of the developed countries of the world. For example, the share of agriculture has declined to 54 per cent in 1960-61, 48 per cent in 1970-71, 40 per cent in 1980-81 and then to 18.0 per cent in 2008-09, whereas in U.K. and U.S.A. agriculture contributes only 3 per cent to the national income of these countries.

2. Source of Livelihood: In India over two-thirds of our working population are engaged directly on agriculture and also similarly depend for their livelihood. According to an estimate, about 66 per cent of our working population is engaged in agriculture at present in comparison to that of 2 to 3 per cent in U.K. and U.S.A., 6 per cent in France and 7 per cent in Australia. Thus the employment pattern of our country is very much common to other under-developed countries of the world.

3. Source of Food Supply: Agriculture is the only major source of food supply as it is providing regular supply of food to such a huge size of population of our country. It has been estimated that about 60 per cent of household consumption is met by agricultural products.

4. Role of Agriculture for Industrial Development: Agriculture in India has been the major source of supply of raw materials to various important industries of our country. Cotton and jute textiles, sugar, vanaspati, edible oil plantation industries (viz. tea, coffee, rubber) and agro-based cottage industries are also regularly collecting their raw materials directly from agriculture.

About 50 per cent of income generated in the manufacturing sector comes from all these agro-based industries in India. Moreover, agriculture can provide a market for industrial products as increase in the level of agricultural income may lead to expansion of market for industrial products.

5. Commercial Importance: Indian Agriculture is playing a very important role both in the internal and external trade of the country. Agricultural products like tea, coffee, sugar, tobacco, spices, cashew-nuts etc. are the main items of our exports and constitute about 50 per cent of our total exports. Besides manufactured jute, cotton textiles and sugar also contribute another 20 per cent of the total exports of the country. Thus nearly 70 per cent of

India's exports are originated from agricultural sector. Further, agriculture is helping the country in earning precious foreign exchange to meet the required import bill of the country.

6. Source of Government Revenue: Agriculture is one of the major sources of revenue to both the Central and State Governments of the country. The Government is getting a substantial income from rising land revenue. Some other sectors like railway, roadways are also deriving a good part of their income from the movement of agricultural goods.

7. Role of Agriculture in Economic Planning: The prospect of planning in India also depends much on agricultural sector. A good crop always provides impetus towards a planned economic development of the country by creating a better business climate for the transport system, manufacturing industries, internal trade etc.

A good crop also brings a good amount of finance to the Government for meeting its planned expenditure. Similarly, a bad crop lead to a total depression in business of the country, which ultimately lead to a failure of economic planning. Thus the agricultural sector is playing a very important role in a country like India and the prosperity of the Indian economy still largely depends on agricultural sector. Thus from the foregoing analysis it is observed that agricultural development is the basic precondition of sectoral diversification and development of the economy.

An increasing marketable surplus of agricultural output is very much essential in India for:

- (i) Increasing supply of food and raw materials at non-inflationary prices;
- (ii) Widening the domestic market for industrial products through higher purchasing capacities in the rural sector;
- (iii) Facilitating inter-sectoral transfers of capital needed for industrial development along-with infra-structural development;
- (iv) Increasing foreign exchange earnings through increasing volume of agricultural exports.

IMPORTANCE OF AGRICULTURE IN EMPLOYMENT

- 1. Agriculture is also a source of employment. It is providing employment to many of the people. Many of the laborers get their wages daily through agriculture either they are tractor drivers, grass cutters, many technicians of farming apparatuses or everyone who indulges in such cultivation activities.
- 2. Also, there are a lot of medicines made from plants and natural herbs so this is a place for such business also. Good knowledge of such plants gives you a useful job.
- 3. There are also special horticultural universities in India like Nauni University in Himachal Pradesh etc. These educational firms are telling the youngsters the importance of agriculture and guiding them about how agriculture can be a profession.

4. Many researchers and scientists are doing well in the agriculture sector. This is the sector providing them employment.

5. Agriculture also used in the clothing sector. Jute, silk, cotton etc are one of the most demanded clothing today. This provides employment to the concerned people.

CHALLENGES BEFORE INDIAN AGRICULTURE

The agriculture sector has the most challenging sector in respect of economically, environmentally and socially. The Indian agriculture sector faced various traditional as well as new global challenges the key challenges addressed as follows.

1. Instability: It is said that Indian agriculture is a ‘gamble of monsoon’. It is at the mercy of the weather god. Being of rain-fed, Indian agriculture exhibits instability in production, leading to fluctuations in national income as well as general price level.

This is what we experienced in 2002-03 when agriculture made a disastrous start. An all-time record in food grains production was achieved in 2001-02. In 2002-03, the first ever deficient monsoon in 15 years was declared.

The rainfall deficiency for the country as a whole amounted to more than 20 p.c. in 2003-04. As a result, the production of food grains fell by about 14 p.c. and non-food grains by 9 p.c. Reports of starvation death from two drought-hit states of Rajasthan and Madhya Pradesh indicate the dismal performance of the agricultural sector over the last 58 years or so.

Thus, the fortune of the Indian economy is very much tied to rain-dependent agriculture. This element of instability makes it a precarious occupation. Besides weather-induced fluctuations, one also finds that output of this sector is also affected due to reduced capital investment and plateauing of yield levels in major crops. Further, with uncertain-ties in global markets, and hardening of the prices of food, fuels and edible oils all over the world, domestic price stability and food security critically depend on the growth of this sector.

2. Cropping Pattern: The crops that are grown in India are divided into two broad categories: food crops and non-food crops. An unhealthy competition exists between these two crops. Of the total cropped area, nearly three-fourths are occupied by food crops.

The ratio of food grains to non-food grains was 80:20 in 1980-81 vis-a-vis 77:23 in 1950-51. By 2000-01, the area under non-food grains increased to roughly 35 p.c. Within food grains, largest increase in area has been recorded by wheat, followed by rice. Within commercial crops, largest increase-has occurred in the case of sugarcane, followed by oilseeds and cotton. The horticulture sector contributed about 28 p.c. of GDP in agriculture in 2005-06. Such diversification of farming towards horticulture crops may be related to (i) demand-driven, (ii) supply-driven, and (iii) policy-driven forces.

The important point to note here is that the country is yet to evolve a balanced crop pattern. Since a large proportion of land is devoted to main food crops like wheat and rice, there are shortages of oilseeds and pulses. This is the result of faulty agricultural planning.

For instance, an agricultural price support policy in favour of food crops, mainly wheat and rice in the green revolution period has distorted the cropping pattern. Very little attention has been given to agricultural diversification. Floriculture and horticulture are two profitable agro-business that require special attention.

3. Land Ownership: Vast inequality exists in the distribution of land in India. A great chunk of land is owned by a relatively small section of the rich farmers, landlords and money lenders, while a very little amount of land is owned by the majority farmers. Nearly 76 p.c. of small and marginal farmers own less than 2 hectares of land (2000-01).

Total cultivable land belonging to these people covers as much as 35 p.c. On the other hand, big farmers owning more than 10 hectares land hold as much as 14 p.c. of the cultivable lands.

4. Average size of Holding: Another peculiarity as well as an important problem is the smallness in average size of holding. The average size of holding declined from 2.28 hectares in 1970-71 to 1.41 hectares in 1995-96 and 1.32 hectares in 2002-01. This makes the efficient use of land virtually impossible and adds to the difficulties of increasing capital equipment on the farms.

5. Land Tenure: The land tenure system of India is also far from perfect. Tenants do not enjoy security of tenure. They are evicted by landlords on any pretext.

6. Production Technique: The technique of production in India's agriculture is old and outmoded. Still, Indian farmers are using cow-plough method of cultivation on a large-scale. Use of chemical fertilisers, high-yielding varieties of seeds, tractors, and machines are used on an insignificant scale.

7. Excessive Pressure on Land: Another problem from which Indian agriculture suffers is that the pressure on land as compared to the availability of land is too high. Finding a bleak employment prospects, people take up agriculture as an important occupation.

But they ultimately reduce themselves to part time jobs. As a result, Indian agriculture exhibits the existence of a large bogey of unemployed and disguisedly unemployed. They remain unemployed in part of the seasons. This causes backwardness in Indian agriculture.

8. The conservation and enhancement of ecological foundations for sustainable agriculture, which included land, water, biodiversity, and marine resources. Urbanization and non-agricultural land uses to create tremendous challenge before agriculture.

9. The 80 percent farmers in India having small size of land. They are not economically sound and lack of market attachment. 10. The net income from agriculture of small and marginal farmer's quite low or some time it become negative. Because of large increase in production cost in agriculture sector. 11. The contribution of private sector in agriculture investment quite low and declined trend of public investment in agriculture after 2000.

10. The agriculture productivity is very low and hamper income of the farmers. The per unit area productivity also low in case of major crop producing in countries.

Some other challenges are as follows:

- a. Imbalanced use of Fertilizer & Pesticides
- b. Shortage of good quality Seeds especially for Small and Marginal Farmers
- c. Problem of Irrigation – Wastage of Water on the One Hand and Scarcity of Water on the Other
- d. Soil Erosion, Scarcity of Capital
- e. Lack of PHM and Marketing Facilities – Storage, Transport and Cold Chain, etc.

OPPORTUNITIES FOR INDIAN AGRICULTURE

The following key recommendations has given to ensure higher and inclusive growth in Indian agriculture sector.

- 1. Increasing agricultural productivity is a key challenge for ensuring national food security. To increase production, exploiting the potential of existing yield gaps offers a tremendous opportunity
- 2. Rain fed areas have a huge potential to raise production and increase farm income. These grey areas can soon be made green to harness a second green revolution.
- 3. Linking farmers to markets is a pre-requisite for augmenting farm production and farmers' income. Role of innovative institutions would be critical in this context to reap the benefits of emerging opportunities
- 4. There is a dire need to significantly expand the capital investment in agriculture by both public and private institutions in the non-green revolution regions, particularly in the eastern and north-eastern India, where there is a great potential for agricultural growth.

5. Water will be the most critical natural resource for the future growth of agriculture. Currently, the water sector for irrigation is invariably neglected both at the central and state levels
6. Climate change has added a new dimension to future agricultural growth, which is a major concern. The worst affected would be small farm holders located in the marginal and under-privileged areas.
7. There is an urgent need for agricultural diversification by identifying the key crops/commodities which can help small farm holders to raise their income.
8. Food processing and distribution sector needs to be strengthened by evolving policies for larger private sector participation in the entire value chain.
9. Globalization of agriculture create huge opportunities for enhanced agricultural production and export.

CONCLUSION

Most of the Indians are directly or indirectly depending on the agriculture. Some are directly attached with the farming and some other people are involved in doing business with these goods. India has the capacity to produce the food grains which can make vast difference in Indian Economy. To achieve targeted mark by the government it needs to provide support in case of land, bank loans and other machineries to the small farmers along with the big farmers with this we can expect some improvement in Indian economy.

REFERENCES

- Ministry of External Affairs (2015)India in Business.Investment and Technology Promotion Division, Govt. of India
- <http://www.ccsniam.gov.in/research/KCG%20Final%20report.pdf>
- Indian Brand Equity Foundation(2015)Indian Agriculture Industry: An Overview.
- Department of Agriculture and Cooperation. Ministry of Agriculture, Govt. of India
- Pandey MM (2009) Indian Agriculture–An Introduction.Fourth Session of the Technical Committee of APCAEMChiang Rai, Thailand, pp. 1-39.
- ArjunKM (2013) Indian Agriculture- Status, Importance andRole in Indian Economy.International Journal of Agriculture and Food Science Technology 4:343-346. Greenpeace India (2007), “Hiding Behind the Poor”, Bangalore. www.greenpeace.org.in

- Samantaray, L., (2015), “A Study on the Current Trend of Agriculture Productivity in India and its future prospects.” VoL.2.
- IJHSSE,Ministry of Agriculture (2000). National Agricultural Policy.
- NABARD Annual report 2012 to2017.
- The Economic Survey of India 2014-15, 2015-16.2016-17 and 2017-18
- www.agriculture.gov.in

AN OVERVIEW OF MAJOR PROBLEMS AND POSSIBLE PROSPECTS OF AGRICULTURAL MARKETING IN INDIA

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ABSTRACT

Agriculture is different from industry and plays a significant role in the economic development of a nation. India's prosperity depends upon the agricultural prosperity. There are many kinds of agricultural products produced in India and the marketing of all these farm products generally tends to be a complex process. Agricultural marketing involves many operations and processes through which the food and raw materials move from the cultivated farm to the final consumers. Agriculture provides goods for consumption and exports and manufacturing sectors. The suitable marketing system should be designed so as to give proper reward or return to the efforts of the tiller of the soil. Market information is a means of increasing the efficiency of marketing system and promoting improved price formation. It is crucial to the farmers to make informed decisions about what to grow, when to harvest, to which market produce should be sent and whether or not to store it. Awareness of farmers on different components of market information and its utility was very poor (11 to 37 %) as compared to that of traders (75%). Out of the expectations of farmers on grades, quality, prices in potential markets, price projections; only real time arrivals and prices were documented and disseminated with traditional approach. Hence there is a need to create awareness among the farmers through the agricultural extension agencies like the State Department of Agriculture, Krishi Vigyan Kendra's so that the marketing information on agriculture commodities are incorporated in the extension services along with production aspects to the farmers. Efficient backward and forward integration with agriculture has led to globally competitive production system in terms of cost and quality. Cooperatives seem to be well positioned to coordinate product differentiation at the farm level and to integrate forward

into value added processing activities. Indian agriculture can be balanced and made efficient through proper and better management practices. The present study brings out past and present scenario of agricultural marketing prevailing in India, its challenges and future recommendations. Moreover the opportunities provided by agricultural marketing should be tapped effectively by the marketers.

Keywords: Agriculture, Cultivation, Marketing, Food-Grains, Commercial-Crops, Contract Farming, Commercialization, Foreign Direct Investment (FDI)

INTRODUCTION

Agricultural marketing covers the services involved in moving an agricultural product from the farm to the consumer. Numerous interconnected activities are involved in doing this, such as planning production, growing and harvesting, grading, packing, transport, storage, agro- and food processing, distribution advertising and sale. Some definitions would even include "the acts of buying supplies, renting equipment, (and) paying labor", arguing that marketing is everything a business does. Such activities cannot take place without the exchange of information and are often heavily dependent on the availability of suitable finance (Penn State College of Agricultural Sciences -Agricultural Marketing, 2012) Marketing systems are dynamic; they are competitive and involve continuous change and improvement. Businesses that have lower costs, are more efficient, and can deliver quality products, are those that prosper. Those that have high costs, fail to adapt to changes in market demand and provide poorer quality is often forced out of business. Marketing has to be customer-oriented and has to provide the farmer, transporter, trader, processor, etc. with a profit. This requires those involved in marketing chains to understand buyer requirements, both in terms of product and business conditions.

In Western countries considerable agricultural marketing support to farmers is often provided. In the USA, for example, the USDA operates the Agricultural Marketing Service. Support to developing countries with agricultural marketing development is carried out by various donor organizations and there is a trend for countries to develop their own Agricultural Marketing or Agribusiness units, often attached to ministries of agriculture. Activities include market information development, marketing extension, training in marketing and infrastructure development. Since the 1990s trends have seen the growing importance of supermarkets and a growing interest in contract farming, both of which impact significantly on the way in which marketing takes place. In India, there are network of

cooperatives at the local, regional, state and national levels that assist in agricultural marketing. The commodities that are mostly handled are food grains, jute, cotton, sugar, milk and areca nuts. Currently large enterprises, such as cooperative Indian sugar factories, spinning mills, and solvent-extraction plants mostly handle their own marketing operations independently. Medium- and small-sized enterprises, such as rice mills, oil mills, cotton ginning and pressing units, and jute baling units, mostly are affiliated with cooperative marketing societies.

Market information is an important facilitating function in the agriculture marketing system. It facilitates marketing decisions, regulates the competitive market process and simplifies marketing mechanisms. Market information is a means of increasing the efficiency of marketing system and promoting improved price formation. It is crucial to the farmers to make informed decisions about what to grow, when to harvest, to which market produce should be sent and whether or not to store it. Improved information should enable traders to move produce profitably from a surplus to a deficit market and to make decisions about the viability of carrying out storage where technically possible (Amrutha, 2009). Agricultural marketing can be defined as the commercial functions involved in transferring agricultural products consisting of farm, horticultural and other allied products from producer to consumer. Agricultural marketing also reflect another dimension from supply of produce from rural to rural and rural to urban and from rural to industrial consumers. In the olden days selling of agricultural produce was easy as it was direct between the producer to the consumer either for money or for barter. It brief, it was selling not marketing. In the modern world it became challenging with the latest technologies and involvement of middlemen, commission agents who keep their margins and move the produce further. As it is well known more the number of mediatory more will be the costs as each transaction incurs expenses and invites profits. Ultimately when it comes to the producer the cost of the produce goes up steep. In the entire process of marketing the producer gets the lowest price and the ultimate consumer pays the highest as the involvement of more middlemen in the entire distribution process. There are several complexities involved in agricultural marketing as agricultural produce involves element of risk like perishability and it again depends on the type of produce. If the agriculture produce happens to be a seasonal one it involves another kind of risk. Likewise, there are several risk elements involved in agricultural marketing. The pricing of the produce depends on factors like seasonality and perishability and it depends on the demand and supply also. And all these are interwoven and ultimately make a deep impact on agricultural marketing.

Agriculture in India has directly or indirectly continued to be the source of livelihood to majority of the population. Indian agriculture has seen a lot of changes in its structure. India, predominantly an agricultural economy, has healthy signs of transformation in agriculture and allied activities. India has seen agriculture as a precious tool of economic development as other sectors of production depend on it. Efficient backward and forward integration with agriculture has led to globally competitive production system in terms of cost and quality. Cooperatives seem to be well positioned to coordinate product differentiation at the farm level and to integrate forward into value added processing activities. Indian agriculture can be balanced and made efficient through proper and better management practices. The present study brings out past and present scenario of agricultural marketing prevailing in India, its challenges and future recommendations. Moreover the opportunities provided by agricultural marketing should be tapped effectively by the marketers (Shakeel-Ul-Rehman et al., 2012).

AGRICULTURAL MARKETING IN INDIA

Problems and Prospects

There are several challenges involved in marketing of agricultural produce. There is limited access to the market information, literacy level among the farmers is low, multiple channels of distribution that eats away the pockets of both farmers and consumers. The government funding of farmers is still at nascent stage and most of the small farmers still depend on the local moneylenders who are leeches and charge high rate of interest. There are too many vultures that eat away the benefits that the farmers are supposed to get. Although we say that technology have improved but it has not gone to the rural levels as it is confined to urban areas alone. There are several loopholes in the present legislation and there is no organized and regulated marketing system for marketing the agricultural produce. The farmers have to face so many hardships and have to overcome several hurdles to get fair and just price for their sweat.

GLOBALISATION

The globalization has brought drastic changes in India across all sectors and it is more so on agriculture, farmers and made a deep impact on agricultural marketing. It is basically because of majority of Indians are farmers. It has brought several challenges and threats like uncertainty, turbulence, competitiveness, apart from compelling them to adapt to changes

arising out of technologies. If it is the dark cloud there is silver lining like having excellent export opportunities for our agricultural products to the outside world.

AGRICULTURAL MARKET REFORMS

Below are the certain measures that can be affected to bring out the reforms in agricultural marketing so as to ensure just and fair price for the farming community.

- Provide loans to the farmer at low rate of interest so that they will be freed from the clutches of local moneylenders who squeeze them. It is said that farmer is born into debt, lives in debt and dies in debt. Right from the beginning of the life, the poor farmers approach money lenders for investing into cultivation who levies very high rate of interest and who takes away the maximum amount of the share from the produce. In case if the crop fails due to natural calamities then the situation would be worse as the farmer is not in a position to pay his loans. And ultimately he is forced to sell the land at throw away price to the money lender.
- It is essential to provide subsidized power supply and loans to the farmers as the expenses towards power consumption takes considerable amount of investments.
- Generate a new distribution network that connects the farmers directly to the consumers to get maximum returns as the present channel of distribution involves multiple mediatory who take away the major portion of profits which otherwise the farmers is supposed to get.
- Elimination of the existing loopholes in the present legislations is warranted.
- There should be stringent action against black marketers and hoarders who buy the stocks from farmers at cheap prices and create artificial demand and then sell the stocks at higher prices.
- Creating local outlets at each village where the farmers sell their stocks directly to the consumers or the authorized buyers at fixed prices would help to a great extent. Intervention of government in this network is essential to bring the fruits to the farmers.
- At the village level there should be counseling centers for farmers about the worth of their stocks so that they can get fair price. The crucial role of Non-Governmental Organizations (NGOs) is needed in this context.
- The existing legislations are outdated and are not in tune with the changing trends and technological inventions and the same need to be updated forthwith.

- The retail revolution has brought several changes in the retail sector where the retail giants buy in bulk directly from the suppliers and sell to the consumers directly and in this process they pass the benefits to the consumers as well. In the past the consumers were paying more for less as there were many channels of distribution system and now the consumers pay less for more.
- The government is already fulfilling the objective of providing reasonable prices for the basic food commodities through Public Distribution System with a network of 350,000 fair-price shops that are monitored by state governments. It is more effective in states like Punjab, Haryana and some parts of Uttar Pradesh. And the same needs to be strengthened across the country.
- Government should levy single entry tax instead of levying multiple entry taxes either directly or indirectly for the transactions and activities that are involved in agricultural marketing such as transportation, processing, grading etc., as it would benefit both farmers and consumers directly.

FARMERS ROLE IN MARKETING

Direct marketing of the agricultural produce is the need of the hour. Efforts may be made to provide facilities for lifting the entire stock that farmers are willing to sell with incentive price. There should be provision for storing the stocks such as godowns and warehouses. It helps the farmers to hold the stocks till the prices are stabilized. Usually immediately just after the harvest the prices would be low and if the farmers are patient in holding the same for some time it would fetch better prices. The brokers play the games during the trading of the agricultural stocks which the farmers do not know and realize because of improper information about the market prices. The brokers without any investment and with their negotiation skills transfer stocks by buying at low prices and selling at higher prices to the other end. The farmers need to be educated in this regard. There should be all-round rationalization and standardization of the prices through legislative means. Presently there is vast gap between the marketing strategies of agricultural produce in India and abroad and the same needs to be bridge. Remove the various malpractices prevalent in the present system. There is need to set up marketing committees which has the representation of growers, merchants, local bodies, traders and nominees from the govt. There should be collective and integrative efforts and energies from all quarters for ensuring just and price for farmers.

NEED FOR AGRICULTURE MARKET INFORMATION SYSTEM:

Nickels (1978) in his book on the Principles of Marketing has stated that information is one key to increase marketing success for everyone. A market information system is an important tool used by modern management to aid in problem solving and decision making. Market Information System is a process of gathering, processing, storing and using information to make better marketing decisions and to improve marketing exchange (Amrutha, 2009). Subrahmanyam and Mruthyunjaya (1978) based on their study on marketing of fruits and vegetables in Bangalore suggested for proper dissemination of market intelligence and information through all possible means of communication, for improving the marketing efficiency of fruits and vegetables. Raigar (1988) in his conceptual analysis of Management Information System (MIS) and Management Science opined that though computers have of course a role to play in MIS, all computerized systems do not necessarily mean MIS nor does MIS necessarily imply computerized processing of data to create information. Rahman (2003) reported that the growers received low prices in Bangladesh because of lack of market information which resulted in wide inter-market price variation. Improvement of agricultural market information services was necessary for domestic market efficiency and to integrate domestic agricultural market with regional and international market for sustainable development of agriculture sector and to ensure country's long run food security.

PATTERN OF AWARENESS AND SOURCES OF MARKET INFORMATION:

The awareness on market information in general was found to be relatively poor in case of farmers as compared to the traders since the accessibility of market information in terms of communication systems is very poor in case of farmers. The status of assets on audio visual and communication systems of farmers clearly indicated that radio followed by television were the only assets owned by small farmers. The advanced communication systems like mobile phones were owned by medium and large farmers. A few large farmers also subscribed to agriculture magazines like Annadata, Krishimunnade and Krishipete. However, traders with all the modern and advanced communication gadgets were able to source the market information easily and regularly.

The awareness on market information pertains to only arrivals and prices in local markets in all the categories of farmers. The other important production and marketing parameters like post harvest handlings, grading and standardization, etc were not known to the small and medium farmers but a few large farmers were aware of them. However, the traders were

better informed on market information including arrivals, prices, quality/ standardization, area, prices in reference markets, imports and exports. The illiteracy of farmers (75%) might have contributed to the poor awareness on market information by farmers as compared to traders, wherein 82 per cent of the traders were with collegiate education. Thus, due to poor awareness on market information by farmers vis-à-vis traders the advantages of regulated and orderly market were not realized by the farmers.

Radio and newspapers were the major sources of market information to farmers in general and a few large farmers also sought information from sources like television, magazines and internet at the house hold level. The sources of market information to farmers at village level were found to be friends, neighbours and relatives. Similarly, commission agents formed major source of market information for all categories of farmers at market level indicating that the farmers did not depend much on the market sources like notice boards and announcements. Thus, the formal agencies like RSK's, SHG's, Co-operative societies and Gram Panchayats at village level; and market intelligence cell and regulated markets at market level did not form the major sources of market information to the farmers. Similar observations were made by Yan Bo and Bu Yibio (2003) in China, Rana and Astuti (2003) in Indonesia, Gunatilake (2003) in Sri Lanka and Shreshtha (2003) in Nepal. Similarly, traders also depended on fellow traders, contacts in other markets, news papers etc for their market information. A few traders also depended on APMC bulletins, Agricultural magazines and announcements by APMC. Therefore, it is necessary to strengthen the existing formal sources of market information with information and communication technology so as to provide relevant and scientific information to the farmers and other stake holders so as to enable them to make right decisions in their production and marketing of onion. In this regard, networking of market information at hobli level in the state through existing Raita Samparka Kendras (RSK's and village knowledge centers (VKC's) needs to be developed. The lack of awareness on different aspects of marketing of onion including arrivals and prices by farmers might have resulted in distress sale of onion in the market. It is worth noting that majority of the farmers were not aware of market information pertaining to preparation of the produce for the market by cleaning, drying, sorting and packing. Hence, the market extension activities need to be strengthened to create awareness among farmers on post harvest handling of the crop. In the existing agricultural extension education, only production technologies up to harvesting are covered ignoring post harvest management including marketing aspects.

CONCLUSION

There is no doubt that in any marketing there is a motive towards profit involved and at the same time the marketing is to be based on certain values, principles and philosophies such as offering just and fair prices to the farmers who toil hard to till. Bringing necessary reforms coupled with proper price discovery mechanism through regulated market system will help streamline and strengthen agricultural marketing. In order to avoid isolation of small-scale farmers from the benefits of agricultural produce they need to be integrated and informed with the market knowledge like fluctuations, demand and supply concepts which are the core of economy. Marketing of agriculture can be made effective if it is looked from the collective and integrative efforts from various quarters by addressing to farmers, middlemen, researchers and administrators. It is high time we brought out significant strategies in agricultural marketing with innovative and creative approaches to bring fruits of labor to the farmers.

REFERENCES

- Amrutha C.P. 2009. Market information system and its application for Agricultural commodities in Karnataka state – A case of onion. Ph.D thesis University of Agricultural sciences, Dharwad.
- Anonymous, 2003, FAO/AFMA/Myanmar Regional Seminar on improving Agricultural Marketing Information System. Agricultural Marketing, 45 (4): 2-3.
- Anonymous, 2007, National Horticulture Research and Development Foundation, Pune, reports.
- Brithal, P. S., Jha, A. K. and Singh, H. (2007) “Linking Farmers to Market for High Value Agricultural Commodities”, Agricultural Economics Research Review, Vol. 20, (conference issue), pp. 425-39.
- Cheluvarangappa, T.G., 2007, Supply response and Price Behaviour of Copra in Tumkur District, Karnataka- An Economic Analysis. M.Sc. (Agri) thesis (unpublished), University of Agricultural Sciences, Bangalore.
- Dhankar, G. H., 2003, Development of Internet Based Agricultural Marketing System in India, Agricultural Marketing, 45 (4): 7-16.
- Gunatilke W.D., 2003, Agricultural marketing system in Sri Lanka. Agricultural Marketing, 45(4):55.
- Kashyap, P. and Raut, S. (2006) “The Rural Marketing Book”, Biztantra, New Delhi, India.

- Kiresur V.R., Rama RAO D. and Kalpana Sastry R. 2001, Decision Support System (DSS) in forecasting of future oilseeds scenario in India – A system Dynamic model. Paper presented at the First National Conference on Agro-Informatics (NCAI) organized by Indian Society of Agricultural Information Technology (INSAIT) at UAS, Dharwad. 3-4 June, 2001.
- Metkewar , P.S. and Acharya, H.S., 2001, Information system for regulated agricultural markets, Paper presented at the First National Conference on Agro-Informatics (NCAI) organized by Indian Society of Agricultural Information Technology (INSAIT) at UAS, Dharwad. 3-4 June, 2001.
- Nickels. William G., 1978, Marketing Principles – A Broadened concept of Marketing, Prentice-Hall, Inc., New Jersey. p.139.
- Nikhil, H.N., 2008, A study of Areca nut marketing and prices under economic liberalization in Karnataka, Unpublished M.Sc. Thesis submitted to the University of Agricultural Sciences, Bangalore.
- Pathak, N. (2009) "Contribution of Agriculture to the Development of Indian Economy", The Journal of Indian Management and strategy, Vol. 14(1), Jan-Mar., pp. 52- 57.
- Penn State College of Agricultural Sciences -Agricultural Marketing, 2012
- Rao, M.S. 2011. <http://profmsr.blogspot.com/2008/10/problems-and-prospects-in-agricultural.html#ixzz2DVpRehID>. Under Creative Commons License: Attribution "WHERE KNOWLEDGE IS WEALTH" MSR Leadership Consultants India. <http://profmsr.blogspot.com>
- Rahman Muhammad Fazlur, 2003, Agricultural Marketing System in Bangladesh. Agricultural Marketing, 45 (4): 29-32.
- Rai A.K., Murthy S.N., Agarwal S.B. and Anay Rawat, 2001, Application of information technology in Agriculture marketing, Paper presented at the First National Conference on Agro-Informatics (NCAI) organized by Indian Society of Agricultural Information Technology (INSAIT) at UAS, Dharwad. 3-4 June, 2001.
- Shakeel-Ul-Rehman, M. Selvaraj and M. Syed Ibrahim (2012): "Indian Agricultural Marketing- A Review", Asian Journal of Agriculture and Rural Development, Vol. 2, No.1, pp. 69-75
- Shreshtha K.B., 2003, Agricultural marketing system in Nepal. Agricultural Marketing, 45(4):42-46.
- Sidh R.S., Vatta Kamal and Kaur Arjinder, 2008, Dynamics of institutional agriculture credit and growth in Punjab: Contribution and demand-supply gap, Agricultural Economics Research Review, 21(Conference issue)
- Shivakumar P. and Senthilkumar, S. "Growing Prospective of Retail Industry in and around India", Advances in Management, Vol 4(2), 2011.

- Subrahmanyam, K.V. and Mruthyunjaya R., 1978, marketing of fruits and vegetables around Bangalore. Agricultural Marketing, 9(1): 9-16.
- Tripathi, A. and Prasad, A. R. (2009) “Agricultural Development in India since in Determinants: A Study on Progress, Progress, Performance and Determinants”, Journal of Emerging Knowledge on Emerging Markets, Vol. 1(1), pp. 63-92.
- Yan Bo and Bu Yibio, 2003, Agricultural marketing system in China. Agricultural Marketing, 45(4):33-34.
- <http://www.nistads.res.in>
- <http://www.echoupal.com>
- <http://en.wikipedia.org>

STATUS OF AGRICULTURE IN INDIA

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ABSTRACT

India is considered as one of the fastest growing economies in the world. Agriculture is the mother of any economy, whether it is rich or poor. Much of its influence is economic security continues to be predicated upon the agriculture sector, and the situation is not likely to change in the near future. Even today, the share of agriculture in employment is about 49% of the population, as against around 75% at the time of independence. In the same period, the contribution of agriculture and allied sector to the Gross Domestic Product (GDP) has fallen from 61% to 17% in 2015-16. Around 51% of India's geographical area is already under cultivation as compared to 11% of the world average. China with lesser cultivable land produces double the food grains, i.e. 607 million tons in 2015 -16 as compared with India's 252 million tons in 2015-16. The present cropping intensity of 136% has registered an increase of only 25% since independence. Further, rain fed dry lands constitutes 65% of the total net sown area. There is also an unprecedented degradation of land (107 million ha) and groundwater resource, and also fall in the rate of growth of total factor productivity. This deceleration needs to be arrested and agricultural productivity has to be doubled to meet growing demands of the population by 2050.

Keywords: Status, Agriculture, India

INTRODUCTION

Development of agriculture will help in upliftment of the farmers but also benefit the larger section of the rural poor who are directly engaged in agriculture or indirectly linked with agriculture as consumers. Efficient way of production, stabilized prices, higher income from agriculture would create a more conjugative environment in the country for the development of the economy as a whole and of rural population in particular.

As in most developing countries, Agriculture is an important pillar of the Indian economy. It contributes 22 percent to the country's gross domestic product (GDP). Out of a total 329 million ha, the net cropped area is 142.5 million ha. More than 70 percent of Indians live in rural areas, and agriculture is the major livelihood for the majority of the rural population. Agriculture not only provides food security but also employment opportunities to the vast majority of the rural population. Agriculture supports 115.5 million farm families. It also accounts for 13 percent of the country's exports (Ministry of agriculture, 2004). More than 250 different crops are cultivated in India's varied agro-climatic regions and under different cropping systems. India ranks seventh in total area among the countries of the world, but ranks first in irrigated area (Economic survey, 2007). Nevertheless, Indian agriculture alone is unable to support the livelihood of all agriculturalists because the distribution of farm holdings is largely dominated by small and marginal farmers. Small landholdings of less than 1 ha coupled with low prices of farm produce means that farmers are unable to support themselves through agriculture alone. Since 1951, the proportion of the rural population in the total population has declined sharply, and so has the percentage of the population pursuing cultivation or farming as a profession.

Over the past few decades, the manufacturing and services sectors have increasingly contributed to the growth of the economy, while the agriculture sector's contribution has decreased from more than 50% of GDP in the 1950s to 15.4% in 2015-16 (at constant prices).

India's production of food grains has been increasing every year, and India is among the top producers of several crops such as wheat, rice, pulses, sugarcane and cotton. It is the highest producer of milk and second highest producer of fruits and vegetables. In 2013, India contributed 25% to the world's pulses production, the highest for any one country, 22% to the rice production and 13% to the wheat production. It also accounted for about 25% of the total quantity of cotton produced, besides being the second highest exporter of cotton for the past several years. However, the agricultural yield (quantity of a crop produced per unit of land) is found to be lower in the case of most crops, as compared to other top producing countries such as China, Brazil and the United States. Although India ranks third in the production of rice, its yield is lower than Brazil, China and the United States. The same trend is observed for pulses, where it is the second highest producer.

IMPACT OF GLOBALIZATION ON INDIAN AGRICULTURE

Cost of Cultivation

A study by Sen and Bhatia (2004) based on cost of cultivation data indicates in the growth of farm business income (FBI) over time. This study shows that the all India rate of growth of real (deflated by Consumer Price Index for Agricultural Laborers) FBI per hectare declined sharply from 3.21% per annum during the 1980s to only 1.02% per annum during 1990s. However, farmer is interested in farm income rather than price-cost or FBI per hectare. Estimates of FBI per cultivator using growth of cultivators and cropped area revealed that the growth rate was 1.78% per annum in the 1980s but decelerated to 0.03% per annum in the 1990s- indicating almost stagnant FBI per cultivator in the later period.

Farmers' Suicides

As per the latest data, by 2016, April 116 farmers have committed suicide due to agrarian reasons, with maximum cases reported in Maharashtra, followed by Punjab and Telangana. More than 2,000 farmers' suicide cases were reported due to agrarian reasons in 2015 with highest number of 1,841 cases in Maharashtra alone. Most of the suicides in India are attributed to debt trap, crops failures, failure of continuous monsoons and drought. Telangana is mostly dependent on dry land farming. Most of the agriculture in Telangana is dependent on monsoon, tanks, dug wells and bore wells. Due to scarcity of water, farmers are going for bore wells by taking loans. But, due to ground water depletion, most of the bore wells failed. There are many farmers dug up to 12 bore wells for search of water. In the event of failure of all bore wells, they committed suicides for non-payment of loans

Declining Productivity in Agriculture and Increasing Marginalization of Peasantry: Per unit area productivity of Indian agriculture is much lower than other major crop producing countries. **Shifting in Cropping Pattern, Increasing Landlessness and Inequality in Landholdings:** India shifted its cropping pattern from less-remunerative food grains to high-value and export-oriented cash crops and concentration of land through purchase or leasing in by big landowners in the name of private firms

(Ramachandran and Ramakumar 2000; Athreya 2003). That is why during the post reform period there has been an increase in the inequality of distribution of land owned.

Issues/Causes for Indian Agricultural Crisis

There are two reasons to be concerned that Indian agriculture may indeed be facing a wider, deeper crisis:

- (1) The long term growth trend in production and productivity of agriculture, considerably less than required to sustain the high overall growth rates in the coming decade and
- (2) the growing economic and social disparities between agriculture and the rest of the economy and between rural and urban sectors. Apart from these other important issues/causes observed are as follows:

Declining Growth Rates of Agriculture: Declining growth rate of agriculture in the early reform period (1991-92 to 1996-97) from 3.66% to 1.2% per annum in 2015-16

Low level of Income of Small Farmers:

Price is income for any producer. Industrialists can fix the prices of their products. But, unfortunately in our country, it is pitiable that the farmers cannot fix the prices of their crops. Another concern is widening economic disparities between agricultural and non-agricultural sectors and between rural and urban areas. Rural-urban disparities in basic social amenities have also increased in quality though not in quantity. All these have led to resentment among the rural population that the benefits of development have gone to the urban areas. India's economic liberalization in the early 1990s resulted in high rates of growth, whether it reduced the numbers of poor or benefit only increasingly wealthy urban elite is a question.

Decline in Public Investment in Agricultural Research and Extension and Irrigation: Liberalization led to a drastic decline in the growth rate of public spending on agricultural research and extension. The growth rate of public spending on agricultural research and extension during 1980s to 1990-2005 has fallen from 6.3 and 7 per cent to 4.8 and 2 per cent respectively.

Lack of Easy and Cheap Loan to Agriculture

The National Commission for Agriculture, headed by Dr M.S. Swaminathan, also pointed out that removal of the lending facilities and concessions of banks during the post-reform period have accelerated the crisis in agriculture. Studies show that most of the farmers' suicides were due to the debt trap.

Small and Fragmented Land-Holdings is one of the main causes of our low agricultural productivity and backward state of our agriculture. Shortage of Quality Seeds: Unfortunately, good quality seeds are out of reach of the majority of farmers, especially small and marginal farmers mainly because of exorbitant prices of better seeds. Some of the multi-national and other companies selling fake and terminal seeds causing farmers' suicides. In the olden days farmers used to prepare their own seeds for future crops. But, today most of the farmers are dependent on seed companies. Due to this, MNCs and other seed companies are exploiting our farmers. Inadequate Irrigation Facilities: India cannot achieve sustained progress in agriculture unless and until more than half of the cropped area is brought under assured irrigation. Lack of Mechanization, Lack sufficient no. of Regulated Markets, Inadequate storage facilities, inadequate transport, Scarcity of Capital, Reduction in Food Crops, Unemployment in the Agricultural Sector and Farmers' Suicides etc.

Revival of agriculture

To achieve 4% growth and equity in agriculture, the supply and demand side constraints have to be removed. The support systems have to be tuned to improve productivity and incomes of farmers with emphasis on small and marginal farmers and dry land areas.

Special Agriculture Zones (SAZs) - SAZs should be designed to conserve prime farm land so that we do not revert to a ship-to-mouth existence

Open Markets - Farmers must have the freedom to sell their produce to anyone, anywhere. Taxes, levies and commissions on agricultural commodities across states need to be rationalized to less than 4 per cent, currently it is ranging from less than 2 per cent in Gujarat to about 14.5 per cent in Punjab. It is advised to encourage the farmers to sell their produce in the similar way like "Rythu Bazars" i.e. to say all the medium and small

farmers should sell their produce by establishing cooperative markets themselves in order to eliminate “middle men”.

Direct Cash Transfer- We should reorient food and fertilizer subsidies by moving to cash transfers to identified beneficiaries. This will help in reducing leakages and will also help in curbing corruption and will make process more transparent.

Demand Side Issues: (a) Adequate insurance is needed for those carrying out diversification within agriculture or from agriculture to non-agriculture. (b) Social security should be provided for the unorganized workers also.

Subsidies: Developed countries, while they offer subsidies to their farmers and reluctant to cut them. At the same, they argue to cut subsidies to farmers in developing countries like us. Hence, India should stress on the implementation of Uruguay round agreements to reduce subsidies and other distortions caused by policies pursued by developed countries.

Reducing rural poverty through a socially inclusive strategy that comprises both agriculture as well as non-farm employment

Raising agricultural productivity per unit of land . sustainability of agriculture by focusing on environmental concerns.

ENSURING THAT AGRICULTURAL GROWTH RESPONDS TO FOOD SECURITY NEEDS

To achieve 4% growth in agriculture and raise incomes of the farmers.

Seed Banks: In case there is a prolonged dry spell between rains, seedlings may wither. Therefore, seed banks with alternative short-duration crops should be built up and the choice of alternative crops could be according to both home needs and market demand.

Mandatory Rainwater Harvesting in all farms for crop-life-saving irrigation if there is a prolonged dry spell. Wherever farms are small, community rainwater harvesting can be promoted.

REFERENCE

- Acharya, S. S and Jogi, R. L. 2004. Farm Input Subsidies in Indian Agriculture. Working Paper 140, Institute of Development Studies, Jaipur.
- Acharya, S. S. 2000. Subsidies in Indian Agriculture and Their Beneficiaries. Agril. Situation in India, 47 (5) 251-60.
- Acharya, S. S. and Agarwal, N. L. 1987. Agricultural Marketing in India. Oxford & IBM Publishing Co., New Delhi.
- Ramachandran, V. K. 2006. Crop Diversification in Indian Agriculture: A Note. Unpublished Manuscript, Indian Statistical Institute, Kolkata.
- Ramachandran, V. K. and R. Ramakumar. 2000. Agrarian Reforms and Rural Development Policies in India: A Note, Paper presented at the Inter. Conf. on Agrarian Reform and Rural Dev. Dept. of Agrarian Reform, Govt. of the Philippines and the Philippines Devp. Academy, Tagaytay City, December 5 to 8.
- Ramachandran, V. K. and Swaminathan, Madhura. 2001. Does Informal Credit Provide Security? Rural Banking Policy in India”, Int. Labour Offi., Geneva.
- Sen, Abhijit and M.S. Bhatia. 2004. State of the Indian Farmer: Cost of Cultivation and Farm Income in India, Academic Foundation, New Delhi.

GOVERNMENT SCHEMES AND PROGRAMMES IN AGRICULTURE

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ABSTRACT

Agriculture is the science and art of cultivating plants and livestock. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years ago.

Keywords: Government, Schemes, Programs, Agriculture

INTRODUCTION

Agricultural sector plays a strategic role in the process of economic development of a country. It has already made a significant contribution to the economic prosperity of advanced countries and its role in the economic development of less developed countries is of vital importance.

In other words, where per capita real income is low, emphasis is being laid on agriculture and other primary industries. Increase in agricultural production and the rise in the per-capita income of the rural community, together with the industrialisation and urbanisation, lead to an increased demand in industrial production.

IMPORTANCE OF AGRICULTURAL SECTOR IN A COUNTRY'S ECONOMIC DEVELOPMENT

Various under-developed countries of the world engaged in the process of economic development have by now learnt the limitations of putting over-emphasis on industrialisation as a means to attain higher per capita real income. Thus industrial and agricultural developments are not alternatives but are complementary and are mutually supporting with respect to both inputs and outputs. It is seen that increased agricultural output and productivity tend to contribute substantially to an overall economic development of the

country; it will be rational and appropriate to place greater emphasis on further development of the agricultural sector.

Agriculture makes its contribution to economic development in following ways: By providing food and raw material to non-agricultural sectors of the economy, by creating demand for goods produced in non-agricultural sectors, by the rural people on the strength of the purchasing power, earned by them on selling the marketable surplus, by providing investable surplus in the form of savings and taxes to be invested in non-agricultural sector, earning valuable foreign exchange through the export of agricultural products, and by providing employment to a vast army of uneducated, backward and unskilled labour.

As a matter of fact, if the process of economic development is to be initiated and made self-sustaining, it must begin with agricultural sector. The agriculture sector is the backbone of an economy which provides the basic ingredients to mankind and now raw material for industrialisation. Lessons drawn from the economic history of many advanced countries tell us that agricultural prosperity contributed considerably in fostering economic advancement.

It is correctly observed that the leading industrialised countries of today were once predominantly agricultural while the developing economies still have the dominance of agriculture and it largely contributes to the national income. For example in India, “still 28 per cent of national income comes from this sector.. Agriculture is the basic source of food supply of all the countries of the world whether underdeveloped, developing or even developed. Due to heavy pressure of population in underdeveloped and developing countries and its rapid increase, the demand for food is increasing at a fast rate.

If agriculture fails to meet the rising demand of food products, it is found to affect adversely the growth rate of the economy. Raising supply of food by agricultural sector has, therefore, great importance for economic growth of our country. Agricultural advancement is necessary for improving the supply of raw materials for the agro based industries especially in our developing country. The shortage of agricultural goods has its impact upon industrial production and a consequent increase in the general price level. It will impede the growth of the country’s economy. The flour mills, rice shellers, oil and similar mills, bread, meat, milk products sugar factories, wineries, jute mills, textile, leather mills including pharmaceutical

and numerous other industries are based on agricultural products. The progress in agricultural sector provides surplus for increasing the exports of agricultural products. In the earlier stages of development, an increase in the exports earning is more desirable because of the greater strains on the foreign exchange situation needed for the financing of imports of basic and essential capital goods. We are of the opinion that in view of the urgent need for enlarged foreign exchange earnings and the lack of alternative opportunities, substantial expansion of agricultural export production is frequently a rational policy even though the world supply—demand situation for a commodity is unfavourable. Initially, agriculture absorbs a large quantity of labour force. In Tanzania still about 70 to 80 per cent labour is absorbed in this sector. Agricultural progress permits the shift of manpower from agricultural to non-agricultural sector. In the initial stages, the diversion of labour from agricultural to non-agricultural sector is more important from the point of view of economic development as it eases the burden of surplus labour force over the limited land. Thus, the release of surplus manpower from the agricultural sector is necessary for the progress of agricultural sector and for expanding the non-agricultural sector, i.e. industrialisation and tourism. The development of agriculture requires roads, market yards, storage, transportation railways, airways, ships, postal services and many others for an infrastructure creating demand for industrial products and the development of commercial sector.

The development of agricultural sector has minimised the burden of several developed countries that were facing the shortage of foreign capital. If foreign capital is available with the ‘strings’ attached to it, it will create another significant problem. Agriculture sector requires less capital for its development thus it minimises growth problem of foreign capital. In a country which is predominantly agricultural and overpopulated, there is greater inequality of income between the rural and urban areas of the country. To reduce this inequality of income, it is necessary to accord higher priority to agriculture.

The prosperity of agriculture would raise the income of the majority of the rural population and thus the disparity in income may be reduced to a certain extent. If the agricultural sector does not grow at a faster rate, it may result in the growing discontentment amongst the masses which is never healthy for the smooth running of our democratic government. For economic development, it is necessary to minimise political as well as social tensions. In case the majority of the people have to be kindled with the hopes of prosperity, this can be attained with the help of agricultural progress. Thus development of agriculture

sector is also relevant on political and social grounds. The development of agricultural sector would tend to increase the purchasing power of agriculturists which will help the growth of the non-agricultural sector of the country. It will provide a market for increased production.

In underdeveloped countries, it is well known that the majority of people depend upon agriculture and it is they who must be able to afford to consume the goods produced. Therefore, it will be helpful in stimulating the growth of the non-agricultural sector. Similarly improvement in the productivity of cash crops may pave the way for the promotion of exchange economy which may help the growth of non-agricultural sector. Purchase of industrial products such as pesticides, various farm machineries etc. also provide boost to industrial dead out. According to our current 5th phase and the previous governments “Agricultural progress is essential to provide food for growing non-agricultural labour force, raw materials for industrial production and saving and tax revenue to support development of the rest of the economy, to earn foreign exchange and to provide a growing market for domestic manufactures.”

IMPORTANT GOVERNMENT SCHEMES & PROGRAMMES IN AGRICULTURE

Nowadays Government of India is giving more priority for the welfare of farmers. In this regard it is implementing several farmers welfare schemes to re-vitalize agriculture sector and to improve their economic conditions. Therefore, the government has rolled out new initiatives, schemes, programmes and plans to benefit all the farmers. These schemes or programmes are very helpful for the farmers and he or she must know about it so as to take its benefit.

1. SOIL HEALTH CARD SCHEME

Launched in 2015, the scheme has been introduced to assist State Governments to issue Soil Health Cards to all farmers in the country. The Soil Health Cards provide information to farmers on nutrient status of their soil along with recommendation on appropriate dosage of nutrients to be applied for improving soil health and its fertility.

2. PRADHAN MANTRI FASAL BIMA YOJANA (PMFBY)

PMFBY is an actuarial premium based scheme under which farmer has to pay maximum premium of 2% for Kharif, 1.5% for Rabi food & oilseed crops and 5% for annual commercial/horticultural crops and remaining part of the actuarial/bidded premium is shared equally by the Centre and State Government. One of the objectives of the scheme is to facilitate prompt claims settlement. The claims must be settled within two months of harvest subject to timely provision of both yield data and share of premium subsidy by the State Government.

3. NEEM COATED UREA (NCU)

This scheme is initiated to regulate use of urea, enhance availability of nitrogen to the crop and reduce cost of fertilizer application. NCU slows down the release of fertilizer and makes it available to the crop in an effective manner. The entire quantity of domestically manufactured and imported urea is now neem coated. It reduces the cost of cultivation and improves soil health management.

4. PRADHAN MANTRI KRISHI SINCHAI YOJANA (PMKSY)

It was launched on 1st July, 2015 with the motto of ‘Har Khet Ko Paani’ for providing end-to end solutions in irrigation supply chain, viz. water sources, distribution network and farm level applications.

PMKSY not only focuses on creating sources for assured irrigation, but also creating protective irrigation by harnessing rain water at micro level through ‘Jal Sanchay’ and ‘Jal Sinchan’.

Micro irrigation is to be popularised to ensure ‘Per drop-More crop’. PMKSY adopts State level planning and projectised execution that allows States to draw up their own irrigation development based on District Irrigation Plans and State Irrigation Plans.

Components:

Accelerated Irrigation Benefit Programme(AIBP): implemented by Ministry of Water Resources, RD & GR.

PMKSY (Har Khet ko Pani): implemented by Ministry of Water Resources, RD & GR

PMKSY (Watershed): implemented by Department of Land Resources.

PMKSY(Per Drop More Crop - PDMC)

5. PARAMPARAGAT KRISHI VIKAS YOJANA (PKVY)

It is implemented with a view to promote organic farming in the country. To improve soil health and organic matter content and increase net income of the farmer so as to realise premium prices. Under this scheme, an area of 5 lakh acre is targeted to be covered through 10,000 clusters of 50 acre each, from the year 2015-16 to 2017-18.

6. NATIONAL AGRICULTURE MARKET (E-NAM)

It provides e-marketing platform at national level and support creation of infrastructure to enable e-marketing.

This innovative market process is revolutionizing agriculture markets by ensuring better price discovery. It brings in transparency and competition to enable farmers to get improved remuneration for their produce moving towards ‘One Nation One Market’.

7. MICRO IRRIGATION FUND (MIF)

A dedicated MIF created with NABARD has been approved with an initial corpus of Rs. 5000 crore (Rs. 2000 crore for 2018-19 & Rs. 3000 crore for 2019-20) for encouraging public and private investments in Micro irrigation. The main objective of the fund is to facilitate the States in mobilizing the resources for expanding coverage of Micro Irrigation.

MIF would not only facilitate States in incentivizing and mobilizing resources for achieving the target envisaged under PMKSY-PDMC but also in bringing additional coverage through special and innovative initiatives by State Governments.

An Advisory Committee has been set up to provide policy direction and ensure effective planning, coordination and monitoring of the Micro Irrigation Fund.

8. AGRICULTURE CONTINGENCY PLAN

Central Research Institute for Dryland Agriculture (CRIDA), ICAR has prepared district level Agriculture Contingency Plans in collaboration with state agricultural universities using a standard template to tackle aberrant monsoon situations leading to drought and floods, extreme events (heat waves, cold waves, frost, hailstorms, cyclone) adversely affecting crops, livestock and fisheries (including horticulture).

Total 614 district agriculture contingency plans are placed in the ‘farmer portal’ of the Ministry of Agriculture and Farmers Welfare, Government of India (<http://www.farmer.gov.in>) and also in the ICAR / CRIDA website (<http://www.crida.in>) for downloading the full plan by stakeholders for operational use.

9. RAINFED AREA DEVELOPMENT PROGRAMME (RADP)

Rainfed Area Development Programme (RADP) was implemented as a sub-scheme under Rashtriya Krishi Vikas Yojana (RKVY).

10. NATIONAL WATERSHED DEVELOPMENT PROJECT FOR RAINFED AREAS (NWDPRA)

The scheme of National Watershed Development Project for Rainfed Areas (NWDPRA) was launched in 1990-91 based on twin concepts of integrated watershed management and sustainable farming systems.

11. NATIONAL MISSION FOR SUSTAINABLE AGRICULTURE (NMSA)

NMSA is one of the eight Missions under National Action Plan on Climate Change (NAPCC). It aims at promoting Sustainable Agriculture through climate change adaptation measures, enhancing agriculture productivity especially in rainfed areas focusing on integrated farming, soil health management, and synergizing resource conservation.

NMSA as a programmatic intervention caters to Mission Deliverables that focuses mainly on conservation agriculture to make farm sector more productive, sustainable, remunerative and climate resilient by promoting location specific integrated/composite farming systems.

12. LIVESTOCK INSURANCE SCHEME

It aims to provide protection mechanism to the farmers and cattle rearers against any eventual loss of animals due to death. The scheme also demonstrates the benefit of the insurance of livestock to the people and popularizes it with the ultimate goal of attaining qualitative improvement in livestock and their products.

13. NATIONAL SCHEME ON WELFARE OF FISHERMEN

This scheme was launched to provide financial assistance to fishers for construction of house, community hall for recreation and common working place. It also aims to install tube-wells for drinking water and assistance during lean period through saving cum relief component.

14. SCHEME ON FISHERIES TRAINING AND EXTENSION

It was launched to provide training for fishery sector so as to assist in undertaking fisheries extension programmes effectively.

15. GRAMIN BHANDARAN YOJNA

Create scientific storage capacity with allied facilities in rural areas.

To meet the requirements of farmers for storing farm produce, processed farm produce and agricultural inputs.

Promotion of grading, standardization and quality control of agricultural produce to improve their marketability.

Prevent distress sale immediately after harvest by providing the facility of pledge financing and marketing credit by strengthening agricultural marketing infrastructure in the country.

CONCLUSION

In the course of economic development, agriculture employs majority of people. This means raising the level of the national income and standard of living of the common man.

The rapid" rate of growth in agriculture sector gives progressive outlook and further motivation for development. As a result, it helps to create proper atmosphere for general economic development of the economy. Thus, economic development depends on the rate at which agriculture grows.

REFERENCE

- <Https://www.ippmedia.com/en/features/importance-agricultural-sector-country %e2%80%99s - economic-development>
- <Http://www.yourarticlerepository.com/agriculture/10-major-agricultural-problems-of-india-and-their-possible-solutions/20988>

A STUDY ON UNDERSTANDING THE SIGNIFICANCE OF IMPROVING E-GOVERNANCE INITIATIVES IN AGRICULTURE

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ABSTRACT

The Department of Agriculture and Cooperation (DAC), Ministry of Agriculture has decided to implement National e-Governance Programme (NeGP) in the Agricultural Sector as a Mission Mode Project (A-MMP), covering the Agriculture sector, Livestock sector and Fisheries sector. The A-MMP aims to address the needs of the farming community and its other related stakeholders, through provision of relevant information and services through the various delivery channels available in their vicinity for assisting them in making rational decision. Some of the major objectives of the mission under consideration are bridging farmer centricity and service orientation to the programs, enhancing reach and impact of extension services, improving access of farmers to information and services throughout crop cycle, building upon, enhancing and integrating the existing ICT initiatives of centres and other states, enhancing efficiency and effectiveness of various programs through process redesign, more effective and efficient management of schemes of DAC, promoting a common framework across different states. The states are considered, as pilot in the scheme are Assam, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Karnataka and Kerala. These pilot states will implement with a definite scope defined in the project – there should be a centralized Agriculture portal supported and connected with state level Agricultural portals and providing about 12 information services which are defined in it. These services are clustered into 12 categories for better management and implementation of services to the needy farmers across the country.

Keywords: Delivery channels, rational decision, agricultural portals, common framework, service orientation, process redesign

INTRODUCTION

In pre-reform period, agriculture marketing was mainly consists of buying and selling the agricultural commodities only. It never involved the activities like advertisement, promotion and any of modern marketing techniques. When the village economy was more or less self-sufficient, the marketing of agricultural products did not have any difficulty as farmer sold their products to the consumers on cash or barter basis. After independence, because of Green Revolution; Indian agricultural output has enhanced that it is both self-sufficiency and net exporter of variety agricultural products. Yet, most of Indian farmers have remained quite poor. The cause comprises unorganized and incompetent marketing system which is prerequisite to fetch rational returns to for farmers and to make goods available for consumers. Though several steps are taken from Government side at central and state level, lot of disputes and depressions remained in marketing of agricultural products. As most of the agricultural goods are bought and sold through the hands of middlemen, there arise the question of dissatisfaction and injustice in defining the price received by farmers and the price paid by consumer. In India the agricultural products are marketed through traditional marketing methods, where goods are bought and sold in locally available market place known as **BAZAR** or **MONDHA**.

The agricultural sector needs well-functioned market to drive growth, employment and economic prosperity in rural India. In order to provide efficiency and effectiveness in marketing system, huge investments are required for the development of post-harvest and cold storage infrastructure nearer to the field. A major portion of this investment is expected from the private sector for which an appropriate regulatory policy is necessary. Also, Government policies should encourage the procurement of agricultural commodities directly from fields to establish effective linkage between farm production and food processing industries. State Government s has to change their respective APMC Acts accordingly to promote investment in marketing infrastructure which can facilitate direct marketing in national integrated market. Considering the challenges faced by farmers in traditional trading, Government has integrated 21 regulated wholesale markets or Mandis in eight states under online platform on April 14, 2016 as initiative in implementation of online marketing in agricultural sector in India under National Agricultural Market (NAM) platform. On the same ground many of the State Government s and private players like Mandi5.com had launched online wholesale markets for farmers. And as it is open for FDI in food sector marketing in India foreign companies are expected to change the agricultural marketing scenario of Indian market in the nearest future.

On this ground of technical development, it is becoming very necessary to test the reach of technology and literacy of Indian farmers for feasibility in this process. Considering the huge spread out of agricultural sector in terms of number of commodities and geographical reach this study is focused only on greenhouse products. Greenhouses are generally located near to city and reach of technology and access of communication is higher in comparison of remote area. If farmers will be capable enough in using the technology with good economic conditions and operational capacities then only the implementation of online marketing of agricultural greenhouse product is possible.

There should be a centralized Agriculture portal supported and connected with state level Agricultural portals and providing about 12 information services which are defined in it. These services are clustered into 12 categories for better management and implementation of services to the needy farmers across the country. Such categories are:

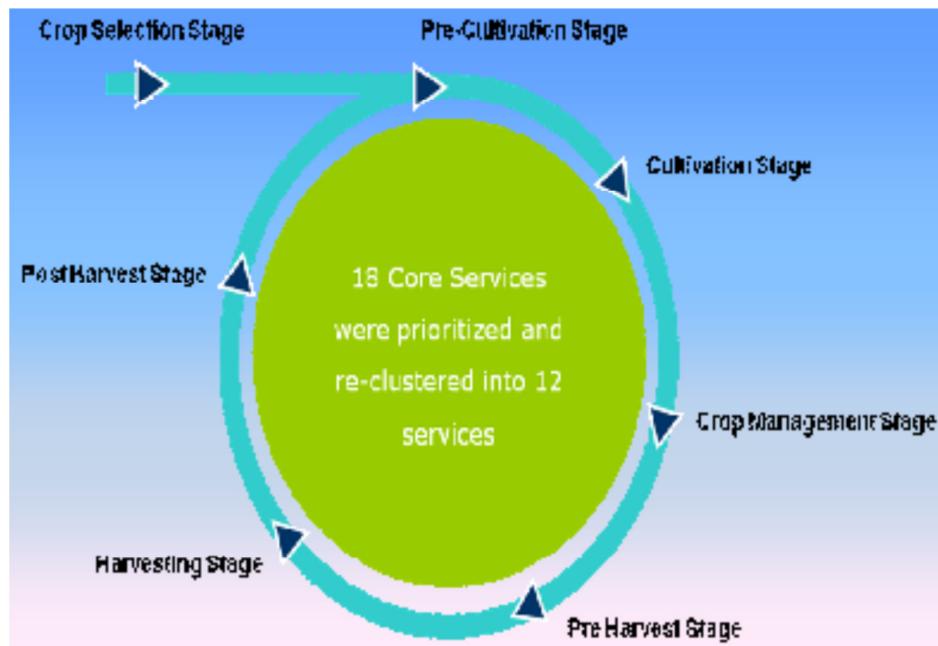
- Information on pesticides, fertilizers and seeds
- Information soil health
- Information on crops, farm machinery and, training and Good Agricultural Practices (GAPs)
- Information on forecasted weather and agro-met advisory
- Information on prices, arrivals, procurement points, and providing interaction platform
- Electronic certification for exports and imports
- Information on marketing infrastructure
- Monitoring implementation/evaluation of schemes and programs
- Information on fisheries
- Information on irrigation infrastructure
- Drought relief and management
- Livestock management

The services are planned and start implementing under these categories are in various states. The basic needs of each farmer-centric are considered as a service under 30 types, which are listed below:

1. **Service-1:** Providing information on quality pesticides
2. **Service-2:** Providing information on quality fertilizers
3. **Service-3:** Providing information on quality seeds

4. **Service-4:** Providing information on soil health
5. **Service-5:** Providing information on crop diseases
6. **Service-6:** Providing information on forecasted weather and Agro-met advisories
7. **Service-7:** Providing market information on prices and arrivals of Agricultural commodities
8. **Service-8:** Providing related market information to facilitate farmers gets better prices
9. **Service-9:** Providing interaction platform for producers, buyers and transport service Providers
10. **Service-10:** Providing information on minimum support price and government procurement points
11. **Service-11:** Providing electronic certification of imports and exports
12. **Service-12:** Providing information on marketing infrastructure and post harvest facilities
13. **Service-13:** Providing information on storage infrastructure
14. **Service-14:** Monitor the implementation of schemes/programs
15. **Service-15:** Providing information on training support to farm schools for adoption of good agricultural practices
16. **Service-16:** Sharing good agricultural practices with farmers and trainers and providing extension support through online video
17. **Service-17:** Providing information on fisheries
18. **Service-18:** Providing information on irrigation infrastructure
19. **Service-19:** Providing information on crops development programme and production technologies to increase production and productivity
20. **Service-20:** Providing information on farm machineries and implements
21. **Service-21:** Providing information on drought related aspects
22. **Service-22:** Providing information on livestock development
23. **Service-23:** Providing information on financial services available from PACs, RRBs and Public sector banks
24. **Service-24:** Providing information on financial security to persons engaged in Agriculture and allied activities through insurance products and other support services (Agricultural insurance services)
25. **Service-25:** Providing information on use of plastics in Agriculture, Horticulture and Floriculture
26. **Service-26:** Providing information on medicinal plants

27. **Service-27:** Providing information on patent on traditional practices
28. **Service-28:** Providing information on allied sectors like Sericulture, Floriculture, Horticulture and Bee-Keeping
29. **Service-29:** Providing information to farmers on food processing technologies
30. **Service-30:** Providing quality information about ways to increase milk production



Information on pesticides, fertilizers and seeds: This service aims at providing information on - good agricultural practices, prevalent prices and availability in an area closest to the farmer, information on dealer network, quality control and assurance mechanism for Pesticides (including insecticides), Fertilizers and Seeds. The service will also automate registration and licensing for manufacturing and marketing of pesticides and fertilizers and process of license to retail seeds, log sale transaction records for different seed varieties down to the district level, process registration of seed growers and certification of seeds, publicly display quality testing of the samples drawn for pesticides, fertilizers and seeds. It will also provide expert advice and grievance management related to pesticides, fertilizers and seeds through multiple service delivery channels to the farmers.

Providing information on soil health: This service aims at providing information on -soil health conditions, package of practices suitable to the soil type, balanced use of fertilizers, automation of soil testing labs for quick dissemination of results, soil surveys, organic

farming, details of soil testing labs, expert advice and grievance management through multiple service delivery channels to the farmers. Farmers would be able to get information on recommended doses based on the recommendations of University or IISS (Indian Institute of Soil Science) formulae. Results of the front line demonstrations conducted on different crops for proving efficacy of soil health management would be listed for different agro climatic zones. Farmers will also be advised about right kind of seeds of the same crop or an alternative crop depending on expected yield and maturity period after considering soil condition and other agro climatic parameters.

Information on crops, farm machinery and, training and Good Agricultural Practices (GAPs):

This service aims at providing information on agronomic practices for different crops as per the recommendations of the Scientific Institutions. Such practices would inform about the week-by-week calendar of activities from pre-sowing to harvesting stage of crop cycle. Best practices for each crop stage for management of plant population, crop stand and monitoring of pests and diseases. Service would be provided through automation of dissemination of information of pest roving survey, expert advice on different aspects of crop management and grievance management through multiple service delivery channels to the farmers. It will also provide information services addressing farm machinery availability, quality and guidance to farmers. It also aims to provide digital tool-kits to trainers and progressive farmers using ICT, and SMS based alerts on training calendar. In addition, the service aims at collecting, storing, indexing and disseminating information on good agricultural practices (GAP) generated by farmers, research institutions.

Information on forecasted weather and agro-met advisory: This service aims at providing - disaggregated district/block level information in each agro-ecological sub region on forecasted weather, agro-met advisory, SMS alerts for weather forecast and crop impact and grievance management through multiple service delivery channels to the farmers.

Information on prices, arrivals, procurement points, and providing interaction platform:

This service aims at providing information on - prices, including minimum support prices (MSPs), SMS based information on MSPs, crop quality associated with MSP and historic prices. It will also provide information on arrivals of different standardized commodities at the market yards, SMS alerts for prices, arrivals and commodity indices, SMS alerts and expert advice on issues related to future prices and arrivals trends and mechanism for

grievance management. It will also provide an e-platform for marketing of agricultural produce, SMS based alerts for buyers and sellers and details of transporters.

Electronic certification for exports and imports: This service aims at providing information on - certification procedure, fees, competent authorities; automation of certification process on a workflow basis, SMS based status alerts and mechanism for grievance management.

Information on marketing infrastructure: This service aims at providing information on - marketing infrastructure at the regulated market yards, post harvest facilities available at the yards. This service also aims at providing information on storage infrastructure like availability, capacity and fees for storages / warehouses of both the private and public sector. This service will also address the information needs of the farmers on credit linkages.

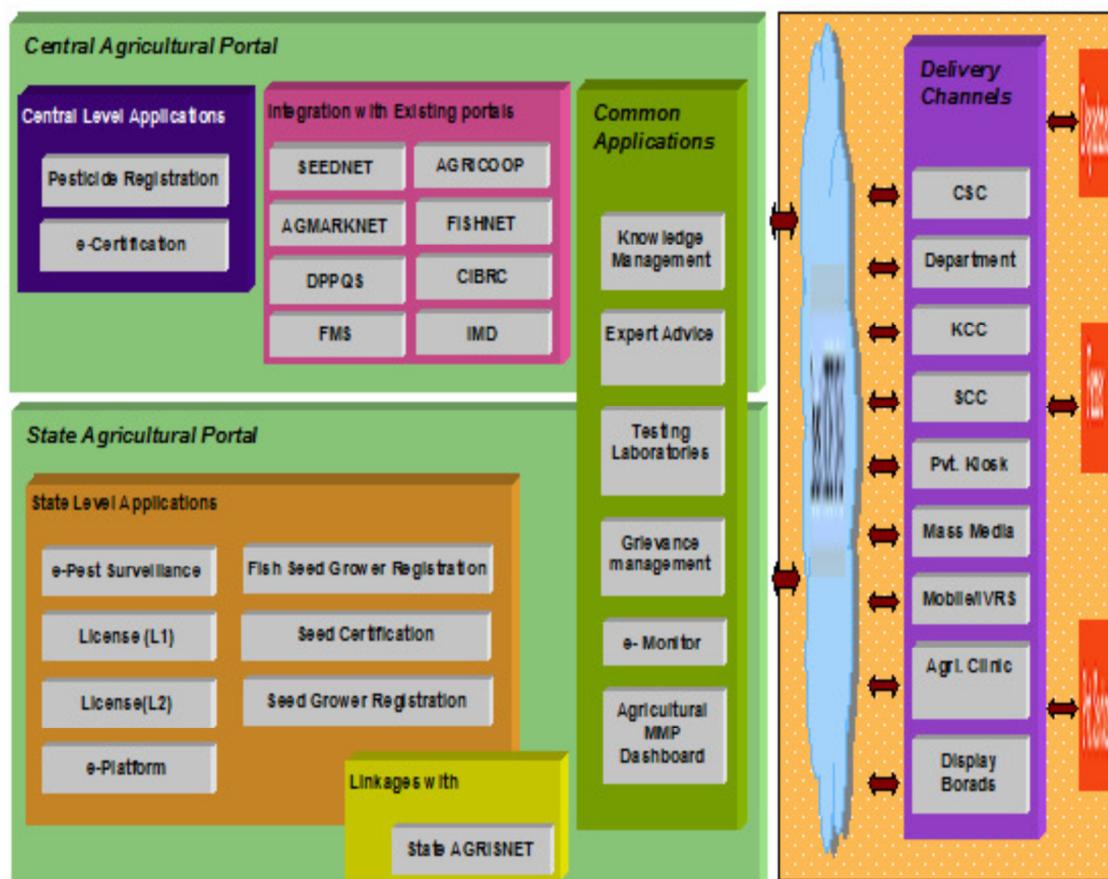
Monitoring implementation/evaluation of schemes and program: This service aims at providing information on - schemes and programs implemented at the state with respect to physical progress and fund utilization, automation of issue and submission of utilization certificate and mechanism for grievance management. It will also provide information on list / categories of beneficiaries and will help remove duplication by codifying and linking them with land records database. This service will also provide the facility to common public and government officials to search for relevant information using customizable queries. Monitoring mechanism for each scheme would be defined and the reports of the monitoring teams would be posted at the end of the scheduled work. Evaluation reports would be listed for different schemes for the past five evaluations. There would be calendar of activities listed for approaching and ongoing evaluation work. There would be calendar of activates listed for approaching and ongoing evaluation work such as – implementation of farmer's friend, demonstration plot concept and farmers' club are major.

Information on fisheries: This service aims at providing information on - good practices for fish farming, efficient use of feed material etc, dealer network, quality control, fishermen safety, fish diseases, schemes for fishermen and fish production statistics, automation of fish seed grower registration, vessel registration, expert advice and mechanism for grievance management.

Information on irrigation infrastructure: This service aims at providing information on - water release schedule, best practices on irrigation, web based interface for selection of beneficiaries under amended NREGA clause, information on ground water, availability and viability of tube wells etc in an area, water level in reservoirs and likely area of different crop mixes that can be irrigated from it, irrigation equipment, expert advice and mechanism for grievance management. The service would list the command area created planned and actually serviced at the end of each crop season under different projects including the Government Tube wells, Lift irrigation and Canal irrigation (including information on distribution network in a command area).

Drought relief and management: This service will provide information on - past /present trends and management by linking with inputs from the States and expert bodies such as Indian Space Application Centre (ISRO), National Remote Sensing Centre (NRSA), India Meteorological Department (IMD) etc. Drought Management Information System (DMIS) will also be upgraded to make it Tehsil centric and, if possible, convert the information to GIS. The service will provide a template for online submission of memorandum on drought relief under NCCF (National Calamity Contingency Fund) based on the manual of drought management published by the department. A template for the report of the central team would also be prepared for online submission of the report. Decision making tools would be backing the report for making recommendations. It will also provide relevant information through upgradation of Drought Management Information System and linkages with efforts of Department of Space.

Livestock management: This service will provide information on – livestock management related activities at the state level; It also aims to provide information and expert advisory on live-stock during normal circumstances and also during drought; it will also provide information on availability of fodder in the nearest region of the farmer.



The implementation of plan was proposed, designed and implemented by NIC was shown above. The central and state agriculture portals form the part of it to provide services to farmers under e-Governance plan. These two portals are integrated with AGRISNET of each state for knowledge dissemination to farmers in language sensitive way. The delivery of services is spread across various mediums to reach to the needy farmers across the villages. These delivery devices include CSCs, KCC, SCC, Private Kiosks, Mass Medias, Department, Agri-clinics, Display boards etc.

ICT's Concepts and Relevance:

ICTs or Information and Communication Technologies are emerging as an important tool for the development of societies and have driving forces in the economies world-wide. ICTs are no more confined to assist high-end research and development; the new technologies have made significant improvements in the life-styles and the efficiency levels all sectors of economy. The positive impact of ICTs is most visible in service-sector, where the efficiency levels have gone very high. New businesses like “Business Process Out-sourcing (BPOs)”, Banking and Insurance, the entertainment industry and other industries and organizations, are

all taking maximum advantage of the ICT revolution. The Agriculture sector is gearing itself to make optimal use of the new information and communication technologies. At the Government of India level, a number of important initiatives have been taken to provide IT Hardware and connectivity to all organization involved in Agricultural Education, research, development and dissemination. Simultaneously Agricultural content development initiatives have been take by Ministry of Agriculture, in collaboration of National Informatics Centre (NIC), to provide marketing information of various agricultural commodities to the farming community. Another content-creation and aggregation initiative is being supported by Indian Council of Agricultural Research (ICAR), under its World Bank aided project – National Agricultural Innovations Project (NAIP), wherein the Leading ICT institutions like IIT Kanpur, IIT Mumbai, IITKM, Kozhikode and International Crop Research Institute for Semi-Arid Tropics (ICRISAT) have been roped in to guide National Agricultural Research System to design, development and implement Knowledge Management Systems (KMS) in Agriculture. ICTs are thus emerging as very important tools for Agricultural Extension, and it is now a must for every Agriculture graduate to have working knowledge of Computers, Communications, Internet and World-Wide-Web.

TRENDS IN AGRICULTURAL INFORMATION MANAGEMENT

Virtual Community:

A virtual community, e-community or online community is a group of people that primarily interact via communication media such as letters, telephone, email or Usenet rather than face to face. If the mechanism is a computer network, it is called an online community. Virtual and online communities have also become a supplemental form of communication between people who know each other primarily in real life. Many means are used in social software separately or in combination, including -based chartrooms and forums that use voice, video and/ or text.

Virtual Information Networks:

A number of virtual information networks with the objective of linking agricultural institutions for facilitating better access to information resources have been initiated successfully. While some of these network agricultural institutions within a country, some link agricultural institutions around the globe.

Electronic Publishing in Agriculture:

Electronic Publishing (e-Publishing) is quickly becoming an important part of publishing mainstream. Recent innovations in this area have made it possible to publish on the information super highway. E-document can be accessed at the computer. It makes much easier for readers to search the information. It is very quick and easy for a reader to browse the table of the contents of previous issues, to jump directly to a particular section of a document or even particular section of an article.

Advantages of e- Publishing:

E-Publishing (EP) difference lies in the new levels of value it provides through features not possible in traditional media. EP products may differ to an even greater degree than print products. Nevertheless, there are some common features to distinguish EP from print Publishing in terms of value to end-users. EP products create additional value for the user with regard to following three dimensions: content availability; content transparency and interactivity and content format.

Institutional Repositories:

Institutional Repositories (IRs) are the digital information warehouses of modern academic institutions. According to Clifford Lynch (2003), the IRs is “a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members”. The key features of a professionally managed IR are: Rich digital Content, up to date full-length Institutional Research papers, full participation of all Research Scientists of the organization, and fully supported by top administration. The benefits of Institutional Repositories include- higher visibility in academic circles, better reach through WWW, efficiency through Centralization of Digital content, Wider access and visibility, Improved impact and citation of their work, Opportunity to share unpublished ideas and know-how, motivation for junior researchers through immediate presence on IR. The IRs also promotes information documentation habit in young researchers and development functionaries.

Institutional Repositories in India:

Institutional Repositories in India are less than 5 years old; many are in the testing phase, and none have more than a few thousand papers. The Indian Institute of Science was the first in

the country to set up an interoperable institutional repository (ePrints@IISc) in 2002 (eprints.iisc.ernet.in). The archive now has more than 3,000 documents, with over 90% having full text. The Institute has a separate Archives Unit and well documented submission guidelines. Other Institutional repositories are very new and not very rich in content. Many are in the testing phase, and none have more than 500 papers.

Concept of Information Kiosk:

The concept of ‘ICT kiosk’ is to provide various services including agricultural information to the rural people to enhance the accessibility of information at village level. The Kiosk has gained wide popularity and is being promoted by various governments and private agencies to address the digital divide, little is known about the critical components required to make such a venture successful. According to a research conducted by Digital Partners, India is way ahead of other countries and regions in the development and use of ICT kiosks.

India also boasts of the highest number of local ICT promoters—most likely because unlike in other countries, technical training in India is available much easily. However, some of the projects in India had to contend with limited success because of lack of awareness within the community. People in villages some time are not aware of the services that these ICT kiosks can bring to them. Perhaps the key issue here would be to consider promoting such facilities before setting up the kiosks and ensure that the effort continues in a sustained manner. The maintenance of equipment at these centers is one of the biggest issues that these projects need to address in order to sustain the effort on a long-term basis.

ICT Indicators and Network Readiness Index of Countries:

In technological terms the ICTs have been defined as the core Computer technologies coupled with communication technologies. For the development sector, however, the ICTs are much more than only digital communication. The Television and Radio have been the key Communication medium for the Agriculture sector not only in developing countries, but also in developed countries as well. And hence the wider definition of ICTs, cover all the modes of Information sharing mechanism, which facilitate development communication. To have a clear understanding of ICTs and for monitoring and evaluating the impact of ICTs on economic and social developments, an International definition of ICT Indicators was required and the same has been developed by the Partnership on Measuring ICT for Development,

under the aegis of a consortium supported by a number international agencies which include- ITU, UNCTAD, UNESCO Institute for Statistics, UNESCWA, Eurostat and the World Bank.

CONCLUSION

The ICT Indicators are the basic tools for the national government to collect relevant data and then prepare a time-series of the same to assess its progress on ICT front. The ICT Indicators do not capture the policy environment and the ICT readiness of its major stakeholders like the government, business, and most importantly the public. The World Economic Forum (WEF), a Geneva-based foundation whose annual meeting of top business leaders, national political leaders (presidents, prime ministers and others), and selected intellectuals and journalists is usually held in Switzerland, has addressed this issue. WEF is bringing out the Global Information Technology Report (GITR), since 2003. The Global Information Technology Report (GITR) has become the world's most respected assessment of the impact of information and communication technology (ICT) on the development process and the competitiveness of nations.

The WEF has defined the Networked Readiness Index (NRI), which measures the propensity of countries to leverage the opportunities offered by ICT for development and increased competitiveness. It also establishes a broad international framework mapping out the enabling factors of such capacity. The Networked Readiness Index examines the preparedness of countries to use ICT effectively on three dimensions: the general business, regulatory and infrastructure environment for ICT; the readiness of the three key stakeholders- the individuals, businesses and governments, to use and benefit from ICT; and their actual usage of the latest information and communication technology available.

REFERENCES

Websites referred:

- Acharya N.G.Ranga Agriculture University <http://www.angrau.ac.in/home.aspx>
- Agri. Market Rates website (NIC) <http://www.agmarknet.nic.in>
- Agricultural and Processed food products Export Development Authority (APEDA)
- <http://www.apeda.com/>
- Agriculture Cooperative <http://agricoop.nic.in/>
- Agriculture <http://www.agricultureinformation.com/forums/organicfarming/>
- 103535-need-details-regarding-organic-forming-telugu-language.html

- Agriculture <http://www.indg.in/agriculture/>
- Agriculture http://www.indg.in/india/home-page/view?set_language=en
- Agriculture Statistics www.indiaagristat.com
- Agriculture Today <http://www.agriculturetoday.in/>
- Agriwatch Portal <http://www.agriwatch.com>
- Agro e-commerce Portal <http://www.agroecommerce.com>
- Agronet Website <http://www.indiaagronet.com>
- Commodity Portal <http://www.indiancommodity.com>
- Department of Agriculture & Cooperation <http://www.agricoop.nic.in>
- Department of Fertilizers <http://www.fert.nic.in>
- Digital Mandi, IIT Kanpur <http://www.digitalmandi.net>
- eFresh <http://www.efreshindia.com/efresh/>
- Fertilizer Statistics <http://www.fertindia.com/>
- Fertilizer Association of India <http://www.faidelhi.org>
- FIEO <http://www.fieo.org>
- Flower Portal www.fredisurti.com
- Food Corporation of India www.fciweb.nic.in
- HAFED <http://www.hafed.nic.in>
- IFFCO <http://www.iffco.nic.in>
- Ikisan Portal <http://www.ikisan.com>
- Indian farmers <http://indianfarmers.org/>
- Indian Society of Agribusiness Professionals <http://www.isapindia.org/isap/>
- ITC <http://www.itcibd.com>
- Jalaspandana <http://www.jalaspandana.org/>
- Kisan Aayog Website <http://www.kisanayog.org>
- Kribhco <http://www.kribhco.net>
- Krishi World Website Portal <http://www.krishiwORLD.com>
- Krishi World <http://krishiwORLD.com/>
- Mahindra Kisan Website <http://www.mahindrakisanmitra.com>
- MCX Commodity Exchange <http://www.mcxindia.com>
- Ministry of Agriculture Portal <http://www.dacnet.nic.in>
- Ministry of food processing industries <http://mofpi.nic.in/>

- Ministry of Rural Development <http://rural.nic.in>
- NABARD <http://www.nabard.org/>
- Nafed <http://www.nafed-india.com>
- National fertilizer ltd <http://www.nationalfertilizers.com/>
- National Multi Commodity Exchange <http://www.nmce.com>
- Navdanya <http://www.navdnya.org>
- NCCF <http://www.nccf-india.com>
- NCDC <http://www.ncdc.nic.in>
- NCDEX Commodity Exchange <http://www.ncdex.com>
- NCUI <http://www.ncui.net>
- NDDB <http://www.nddb.org>
- Press Information Bureau (PIB) <http://pib.nic.in/newsite/rssenglish.aspx>
- Sasyasri <http://sasyasri.cgg.gov.in/theproject.do>
- SRI-RICE <http://sri.ciifad.cornell.edu/extmats/>
- Tea Coffee statistics www.carrittmoren.com
- Uttam Krishi Portal <http://www.uttam krishi.com>
- Village Organics <http://www.villageorganics.in/>

AGRICULTURAL INSURANCE IN KERALA - AN EVALUATIVE STUDY OF CROP INSURANCE

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ABSTRACT

Agriculture plays a vital role in the Indian economy. Previous studies show stat around 58 percent of the rural population depends on agricultural activities for their livelihood. major contributors to the GDP in India from primary sectors are agriculture, fisheries, and forestry. India's agricultural sector faces a lot of risks like unfavorable seasonal changes droughts and floods. So it is necessary for farmers to develop adequate risk management strategies to cope up with these uncertainties. Government has launched numerous schemes like Pradhan Mantri Fasal Bima Yojana, National Agricultural Scheme and Weather Index-Based crop insurance schemes for defending the farmers against risks in agriculture. It is the duty of the government to help farmers to minimize their risk and provide adequate protection techniques. The government of India introduced many agricultural insurance scheme throughout the country to protect the adverse effect of natural calamities which affect the agricultural sector. The PMFBY was launched in 2016 and replaces all the prevailing yield insurance schemes in India. The scheme has been launched with an impetus on the crop sector. This paper is entitled to study the farmer's awareness of crop insurance and Pradhan Mantri Fasal Bima Yojana. The research was conducted among the 100 farmers from Kerala to assess the farmer's perception and awareness about the crop insurance schemes.

Keywords: Crop insurance, Farmers awareness, PMFBY, Government initiatives, Risk mitigation.

INTRODUCTION

One of the riskiest occupations in India is farming; it is subject to vary according to natural like drought cyclone floods etc. The agricultural sector contributes 24 % of GDP and if there is any disturbance in this production of agricultural products causes a multiplier effect on the economy. Insurance helps farmers mitigate their losses. Crop insurance helps the farmers to give protection against unforeseen conditions. The Indian Government has been concerned about the growing risk in agriculture, which culminates in the unfortunate phenomenon of farmers' suicides, as happened In Kerala. In the face of uncertainty and risk in agriculture, various schemes have been evolved over time in different countries to protect farmers; these include guaranteed prices, subsidized credit, and crop insurance, which are of immediate concern in the short-run.

Crop insurance provides farmers' income stability. It provides use of advanced technology in farming, motivating investments, and facilitating credit facilities in farming. Crop insurance provides the farmers confidence for doing farming and allied activities. Farming is a risky business or occupation because unforeseen contingencies affect the results of farming finally it will cause losses. Insurance provides agreements and the opportunity to claim compensation if they have suffered loss due to natural calamities. Thus, it cushions the shock of crop loss by assuring farmers' protection against natural hazards beyond their control. Central Government and state government has initiated a lot of insurance schemes as safety measures in recent years. This study has examined and farmers' perception and awareness about crop insurance and risk involved in agriculture.

REVIEW OF LITERATURE

(Rajaram & B.S, 2018) this study revealed that 80% of the agricultural community in India are small and medium farmers. Performance of agricultural growth, food security and livelihood depends on marginal farmers. The research work is based on a primary survey conducted among farmers to analyze the awareness level of farmers regarding crop insurance schemes. The study revealed that farmers are unaware of market information. The article reviews that there are a lot of market-oriented reforms that are announced by the Government which ensures level playing field in the agriculture sector. This study list out the existing mechanism available to farmers to get essential information regarding water, soil, input, technology, and markets.

(Kb, Vijayabalu, & KS, 2018)the study revealed that there is a necessity to protect farmers from natural disasters and provide better risk-mitigating insurance plans. The government of India has introduced a lot of agricultural schemes all over the country. This article evaluates the nature and scope of Weather Based Crop Insurance schemes in the country and its impact on the farmers in Kerala. The study reveals the dissatisfaction of farmers confronting the Weather Based Crop Insurance Scheme. Even though the role of crop insurance is prized widely as a significant risk mitigation device, this study points that the socio-economic position of the farmers cannot be overcome by this insurance policy because of insufficient policy intervention.

(Devaraju & Kumbalep, 2018)it reveals that protecting the interest of farmers is very significant in any country mainly to have a sustainable economy and food security. India is a developing country around 60 to 70 percent of the Indian population directly or indirectly depending upon the agriculture sector and at present, it contributes 17% of the GDP. Researcher has used multistage sampling in the area of study to collect primary data and also she has used secondary data. This study reveals that farmers are still unaware about the crop insurance scheme and they are not ready take the insurance policy even if they met with huge loss.

(Sundar & Ramakrishnan, 2015)this article attempt to study the extent of crop insurance awareness, purchase benefits of farmers and satisfaction level among 360 farmers in two villages in paddy cultivation- Kunichampet and Mannadipet in Puducherry district. The study revealed that there were constraints like less benefits and farmers are not satisfied with the claim settlement procedures. The researcher suggest that government and insurance company should try to promote crop insurance scheme and provide awareness campaign about advantage of taking policies .

SIGNIFICANCE OF THE STUDY

The all-round devastation caused by the recent floods in Kerala has prompted farmers to opt for crop insurance. The crop insurance schemes are jointly implemented by the Centre and State governments through PSU insurance companies. Recent studies shows that around 55,000 farmers in Kerala have enrolled in 2018-19, enrolment is still low compared to the actual potential in this sector . it shows that farmers are facing difficulties in the area of crop insurance even though government bring more and more schemes to protect the farmers in

Kerala. Seasonal changes in Kerala are common and farmers faces lot difficulties so it is important to study the awareness and perception of farmers regarding crop insurance scheme

STATEMENT OF THE PROBLEM

One of the most important problems faced by farmers is unpredicted climate change. Agricultural sector is the main victim of the unpredicted climate change. So it is important for the farmers to protect their crops from the risk. Insurance is a prime method to mitigate the loss caused by unfavorable climate change. Government of India has introduced many agricultural insurance schemes throughout the country. The present study scrutinizes the nature and scope of Pradhan Mantri Fasal Bima Yojana (PMFBY) and farmers awareness regarding the crop insurance scheme.

SCOPE OF THE STUDY

Present study is focused in farmers Idukki district.

OBJECTIVES

- To assess the awareness and perception of farmers regarding crop insurance schemes.
- To study the role of Pradhan Mantri Fasal Bima Yojana (PMFBY) for developing the agricultural sector
- To provide suggestions to improve awareness among farmers for crop insurance program.

METHODOLOGY OF THE STUDY

Research Design: The present study is descriptive and analytical nature

Sources of Data: The study is conducted by using both primary and secondary data. The primary data were collected from 100 samples from the Idukki district in Kerala through a structured questionnaire. Secondary data were collected as per the requirements of the theoretical framework.

Sample design: Purposive sampling is used for the sample design

Sample size: 100 samples

DATA ANALYSIS

Percentage method and tabulation analysis are used for the analysis of data

Table 1.1 Awareness level of Crop Insurance among farmers

Particulars	No of farmers	Percentage
Aware	62	62
Not aware	38	38
Total	100	100

Source: Primary data

The awareness among farmers regarding crop insurance schemes was quite good. But Only 62% of farmers were aware of the crop insurance schemes.

Table 1.2 Crop Insurance taken by the farmers

Particulars	No of farmers	Percentage
Insured	35	35
Not-Insured	65	65
Total	100	100

Source: Primary data

Only 35% of farmers have crop insurance. most of the farmers are aware of the crop insurance scheme but they are not interested in putting money into this insurance scheme. it shows the low insurance penetration in Kerala and there is a large scope for growth in insurance sector. The government should undertake essential activities to bring more farmers under the crop insurance scheme.

Table 1.3 Source of Information about the Insurance

Particulars	No of farmers	Percentage
Media	20	32
Government departments	10	16

Neighbors and fellow farmers	23	37
Agricultural universities- and research institutes	8	13
NGOs	1	2
Total	62	100

Source: Primary data

It is clear from the above table 1. 3 that the majority (37%) of the farmers got knowledge about crop insurance from neighbors and fellow farmers and 32 % of farmers use media like newspaper, radio, television to aware of the crop insurance.

Table 1.4 Types of risks faced by the framers

Types of risk	No of farmers	Percentage
Drought	10	10
Unavailability of workers	15	15
Flood	35	35
Lack of usage of technology	25	25
Pests	15	15
Total	100	100

Source: Primary data

Natural calamities are a major problem faced by the farmers in Kerala. 35% of farmers are affected by flood at the same time a 25% of farmers are facing risk due to unavailability of innovative technology

Table 1.5 Insurance details of farmers

Crops	No of farmers	Percentage
Paddy	18	50
Tapioca	8	23
Coconut	4	12
Rubber	3	9
Tea	2	6
Total	35	100

Source: Primary data

Farmers insured mainly their paddy crops (50%) because it is more vulnerable to floods, cyclones and drought.

Table 1.6 Satisfaction levels of the farmers regarding the present insurance schemes

Satisfaction level	No of farmers	Percentage
Highly satisfied	6	17
Satisfied	7	20
Neutral	0	0
Dissatisfied	13	37
Highly dissatisfied	9	26
Total	35	100

Source: Primary data

Majority (37%) of the farmers is dissatisfied about the crop insurance schemes and 26 % are highly dissatisfied. Further the small portions (17%) of the farmers are highly satisfied with the crop insurance schemes.

FINDINGS

- Most of the farmers are aware of the crop insurance scheme but they are not interested in putting money in this insurance scheme.
- Most of the farmers got knowledge about crop insurance scheme from Neighbours and fellow farmers and some of them use media like newspapers, radio, television to aware of the crop insurance.
- Natural calamities are a major problem faced by the farmers in Kerala. 35% of farmers are affected by flood at the same time a 25% of farmers are facing risk due to unavailability of innovative technology
- A majority of the paddy farmers have crop insurance. It is more vulnerable to risk due to floods, cyclone, and droughts
- Majority of the farmers is dissatisfied with the present crop insurance schemes.

SUGGESTIONS

- Awareness of farmers regarding crop insurance scheme can be created by way of awareness campaign among the farmers. Local authorities can conduct the awareness programs.
- For protecting farmers government should take initiatives for commencing and support producers limited company by way of providing them with insurance coverage and tax benefits
- Most of the farmers are illiterate, it is difficult for them to understand terms and conditions of crop insurance policies. It is essential to make the policy details in regional language and avoid ambiguous words, it will help the policyholders to understand the policy documents.
- Insurance companies have to adopt effective and speedy grievance redressal mechanism in agricultural insurance.
- Government should take initiatives to promote agricultural insurance through television and radio advertisements.

CONCLUSION

It is essential to take crop insurance scheme for farmers to minimize or reduce the adverse effect of unpredicted climate change. Farmers are facing a lot of problems like financing problems for buying agricultural inputs, climate change, irrigation problems, non-availability of better crops, etc. The government of India introduced PMFBY for the purpose of providing insurance coverage and financial support to farmers in the event of failure of any crops as a result of natural calamities. In a state like Kerala, one of the major problems faced by farmers is unfavorable seasonal changes. Consecutive flood is the best example of that, so crop insurance is the best option for farmers to reduce their losses. But due to the lack of awareness of farmers regarding crop insurance and other important insurance schemes of government they suffer a lot of financial losses. It is the duty of the government to give awareness and protect the interest of farmers in this regard. Finally, insurance companies and regulators need to take a hard look at the efficacy of the PMFBY scheme. Claims are not being honored and insurance companies are making high profits without the benefits trickling down to the farmers.

REFERENCE

- Devaraju, M., & Kumbalep, S. (2018). Awareness and perceptions of farmers about crop insurance -a study in kolar district of karnataka. (1), 90–94.
- Kb, S., Vijayabamu, P., & KS, S. (2018). Farmers ' behaviours and attitudes towards crop insurance scheme in India. International Journal of Pure and Applied Mathematics , (January).
- Rajaram, D. Y., & B.S, C. (2018). A study on awareness level on crop insurance schemes and the factors influencing choice of information sources among farmers Dr. Y. Rajaram 1 and Chetana B.S 2. 6(1), 1–8.
- Sundar, J., & Ramakrishnan, L. (2015). A Study on Awareness , Purchase Benefits and Satisfaction Level Towards Crop Insurance. 7(11), 38–45.

A STUDY ON SYSTEMATIC REVIEW OF LITERATURE ON CONSUMER'S PERCEPTION TOWARDS ORGANIC FOOD PRODUCTS

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ABSTRACT

Organic marketing as such is a holistic marketing system. Organic food market is very challenging in Indian food market in present context. Off late it has been observed that Indian consumers have raised great interest to healthy and quality food with high nutritional value, environmental concern and food safety. An individual with a positive attitude towards an organic food product is more likely to make a purchase; this makes the study of consumer attitudes highly important for a marketer. Food consumption practice is changing worldwide among the consumers and now they want to opt food which is free from synthetic chemicals, fertilizers, and pesticides, i.e., they want to consume for organic food which is not only sustainable for health but also environment- friendly. Organic products are not so much popular among consumers because of lower productivity of organic produce by farmers, which in result lead to the high market price of organic food. There is a need to create awareness about the advantages of organic food products among people and promote its use whereas on the other hand there is the foremost need to motivate the farmers to opt for organic farming. A study on consumer perception regarding organic food may add insight to emerging organic food industry in India and worldwide. The review of related literature in the area of the organic food market and consumer perception studied has provided many insights for the study. It has also provided direction in designing the present study. A number of researchers have identified the demand of organic food products worldwide and in India. Further the various factors that influence consumer perception of organic food products have also been identified. Some studies have also been undertaken preference, knowledge, and

satisfaction regarding organic food products. Having reviewed several studies and having identified the gap, the investigator felt a foremost need to undertake the present investigation.

Keywords: Organic food products, organic food market, Consumer perception, consumer attitude, nutritional value, organic farming

INTRODUCTION

Today organic food industry has grown considerably over recent years on a worldwide basis and has been the subject of much media attention over the past decade. Global demand for organic products remains robust, with sales increasing by over five billion US dollars a year (Willer and Yussefi Menzler, 2002). Over the past several years, the organic food industry in India has been experiencing an annual growth between 20-22 per cent. The nation has the potential to be largest organic food producer. In India, there are over 15,000 certified organic farms and the number is growing fast over the year. Apart from this, there are many small farmers growing organic food by using the organic practices (Menon, 2009). The future of organic agriculture will, to a large extent, depend on consumer demand. Thus, a consumer-oriented approach to understanding holistic and green marketing is important not only in its own right, but also in terms of response to shifting market dynamics. From a marketing perspective, it is important to understand the sustainable attitude of consumers regarding organically produced foods, and how consumption can be promoted. Product development and marketing strategies are also affected by consumer beliefs, attitudes and responses. This could vary depending on the region of the world. Thus, a clear understanding of consumer attitudes and the motivations underlying actions in responding to organically grown products in India is important.

Organic agriculture is a farming system which had been followed by farmers from ancient times, is free from the use of synthetic fertilizers, pesticides, growth regulators and livestock feed additives. As per the definition of the FAO/WHO Codex Alimentarius Commission (2007) , Organic agriculture is an integrated production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity It emphasizes the use of natural inputs (i.e. mineral and products derived from plants) and the renunciation of synthetic fertilizers and pesticides. Organic agriculture is different from conventional type of farming system as it follows the rule of sustainability by using natural inputs, environmentally techniques e.g. intercropping,

crop rotation, mulching etc., the improvement in soil structure and fertility represent the basic rules that make organic agriculture a unique system. The recognition of organic farming is progressively increasing and is now practiced in almost all countries of the world. United States Department of Agriculture (USDA) mentioned that the fast changing trend from chemical based agriculture to organic and eco friendly system of farming is being a major concern at the national and global levels. According to the latest survey, India accounts 5.2 million hectares of organic land and 6,50,000 organic producers. India has the largest number of organic producers in the world. Organic food is defined as a product obtained from an organic farming system which avoids the use of synthetic fertilizers and pesticides. This change in the direction of organic production is getting support from the consumers that are now aware of health hazards; therefore, the demand for the organic food is increasing. Organic food product consumption is also on the rise among consumers all over the world. There is no common definition of “organic” due to the fact that different countries have different standard for products to be certified “organic”. Research has shown that consumers have a basic understanding of the term ‘organic’ (e.g., Bourn and Prescott, 2002; FAO, 1999; Klosky and Tourte, 1998; Goldman and Hylton, 1972). Indian consumers gives their personal definition of the Organic food products as Organic produce or products are those produced and processed through environment friendly techniques, non chemically treated, fresh or minimally processed, non pesticide, free from genetically modified organism, having organic certificates, traditional/indigenous products, herbal product and naturally grown.

The market of organic products is growing as the number of people willing to eat organic food and attitude towards organic food products is increasing. The future of organic agriculture will, to a large extent, also depend on favorable attitude and motivational factors towards organic food products. Several studies have been undertaken to examine issue in the wider context of comprehensive in the area of consumers' behaviour and consumers' attitudes toward organic food (Gracia and de Magistris, 2007; Grankvist and Biel, 2001; Zanoli and Nasppetti, 2002; Chen, 2007; Harper and Makatouni, 2002; Padel and Foster, 2005). The researcher has also found out positive attitude towards organic food products in India, Grankvist and Biel (2001), Gracia and de Magistris (2007), Chen (2007), and Ajzen (1991) Pirjo Honkanen, Bas Verplanken and Svein Ottar Olsen (2006); Victoria Kulikovski and Manjola Agolli (2010) also reinforce this, finding that positive attitudes also will be created toward organic food purchases.

RESEARCH DESIGN

The demand for organic food products is increasing rapidly but the perception of purchasing and consuming of organic product has always been the concern around the globe. An understanding of perception and attitudinal behavior towards purchasing of organic food products will be of great importance to producers (farmers) and retailer (business owner) to understand and fulfill the demand for the organic food products. From last many years several studies have been conducted on organic products, the major concern and need of the present study is to provide complete overview of consumer perceptions regarding organic food products.

MAJOR OBJECTIVES OF THE PRESENT STUDY

Based on the literature review, the specific objectives of the present study are as follows:

1. To provide updated and efficient review of organic market and organic food (World and Indian scenario)
2. To study various research aspect widespread in the ground of consumer perceptions of organic food products through academic research papers.

DATA SOURCE AND METHODOLOGY

In order to review the extensive literature, information were gathered from various research articles published in referred journals and also in electronic databases related to organic market at the world and Indian scenario. Later, an extensive review of the literature was conducted in order to investigate the perceptions of consumers towards organic food products. The journals provide the commendable work of various scholars worldwide which ultimately help to conduct their work in desirable manner. In addition to this, an attempt was made to trace references cited in various published articles and reports related to organic food products. Most of the data have been collected from both primary and secondary sources

FINDINGS FROM THE LITERATURE

OVERVIEW OF ORGANIC MARKET AND ORGANIC FOOD (WORLD AND INDIAN SCENARIO)

Globally, organic food annual market growth has been expanded day by day and in 2010 the annual growth was 23%. Total market of organic food observed up to 59.1 billion US dollar. Highest land acquired by organic apples is in the United States (17272 acres) in 2001. Among

all European countries, Italy, Germany, France, Switzerland and Austria are the leading countries in the sector of organic fruits production (Yadav et al, 2010) .

According to the report on National Program on Organic production 2012, the market size of organic products is increasing rapidly to 47% in EU, 28% in USA, 28% in Canada remarkably. The market is also growing at a healthy rate for Italy and Singapore. Though a large percentage of this demand is fulfilled by the domestic producers of these countries, but there is a huge demand of many other commodities and quantities of the existing commodities too. This gap in demand and supply will give rise to opportunities for developing countries like India to explore.

Organic food products are popular across Europe and United States of America. Asia is not far behind with India being a prominent player. The concept of organic food products is not new to Indian farmers. However, there is not much of a consumption taking place domestically despite the fact that India is one of the top 10 players in the world when it comes to the number of farmers engaged in organic cultivation (Balaji and Injodey, 2017). The demand and consumption of organic food has grown remarkably, both in developed and developing countries. This is so because; consumer is becoming more and more conscious about their health. Although organic food comprises only a small fraction of the food market, its rapid growth has generated much interest among consumers and businesses, as well as researchers. In Malaysia, the perception and understanding of organic food production is based mainly on not using synthetic fertilizers and pesticides. The organic food industry is facing several challenges in Malaysia. Although the demand for organic food in Malaysia is growing, the supply of local organic products is not able to keep up with the increased demand (Somasundram et al., 2014).

The organic food industry in India is also in the early stages of growth. Higher disposable income and greater health awareness have resulted in an increased domestic demand for organic food. There is huge premium in selling organic products, not only to export markets but also to affluent, health conscious domestic consumers (Manaloor et al., 2016). The organic food industry has experienced surprising growth in the past few years. Still, the total percentage of agricultural land in the world that is certified organic still remains around 1% at 43.16 million hectares. This is almost four times the area covered under organic agriculture in 1999 recorded at 11 million hectares (Lernoud and Willer 2016) .

Despite the fact that the growth of consumption in developed countries is expanding the domestic demand in developing countries has been still a challenge for the organic food sector. Many factors are proposed which prevented the domestic growth of organic foods in

developing countries. Some of them were premium price, availability, trust in brand, awareness about organic foods, etc. (Sangkumchaliang and Huang 2012) .

CONSUMER ATTITUDE AND PERCEPTIONS TOWARDS ORGANIC FOOD PRODUCTS

In today's world consumer's food pattern is rapidly changing. The niche market of organic is at the verge of boom. It has been that from last few years the organic products production and availability in the market has been increased and made a significant development in the economy. Several people have started to consider organic food instead of conventional food because it is healthier and less prone to chemicals. This kind of purchasing behavior plays an important role among consumer attitude and perception aspect towards buying of organic food products. Further this, the issues, concern and major reasons have been identified through a broad review of earlier studies.

Approach for buying organic food are mainly influenced by gender, age, income, level of education and the presence of children in the household (**Magnusson et al., 2001; Wier et al., 2003**) , 20]. **Hughner et al.** (2007) identified the main reasons for organic food consumption among consumers. The main reasons are: concerns about health and nutrition, superior taste, care for the environment, food safety, lack of trust in conventional food, care for animal welfare, support the local economy, freshness, curiosity or because they are considered trendy.

According to **Chiciudean et al, 2012**, people consume this type of food from different reasons but most of them are related to animal welfare and environmental friendly. Results indicate that the factors of influence over the consumers depend on gender and age. The organic food is mostly appreciated for its taste and quality. Women are also influenced by price and by the trendy fact of being „organic”. Major differences have been noticed between people with different age regarding promotions, recommendations from acquaintances and advertising. Youngsters are more influenced by advertising than any other group of age while adult people are influenced by promotions.

Shafie and Rennie (2012) assessed consumer perceptions towards organic food and found that food safety, human health and environmental concern along with sensory attributes such as nutritive value, taste, freshness and appearance influence organic food consumer preferences. Premium price continues to suppress organic food consumption. Understanding the grounds of increasing level of organic food consumption such as

motivation are most critical in understanding the potential of the organic food to become a genuinely mainstream market.

Consumers' perceptions regarding organic food consumption are influenced by five factors, namely food safety, price, environmental friendly, nutrition and sensory attributes. Food consumption patterns are ever-changing as a result of health and environmental issues. Interest in organically produced food is changing end-to-end the world by Mukul et al. in 2013 [10].

Mehra and Ratna (2014) found that six significant factors were found to influence the attitude towards organic food. They were perception towards organic food, health consciousness, product information, value for money, accessibility and trust. Results of the study showed that women and younger consumers showed a positive attitude towards organic food and perceived consumption of organic food to be a healthier food option. They were keen on getting product information and compared labels while selecting nutritious food. Women perceived consumption of organic food to be a healthier option.

Sharma and Bali in 2014 concluded that consumers are very much aware that organic food are good for health, these products are free from chemical which resulting in no side effects and do not cause harm to the consumers. The consumers living in urban areas are more aware about organic food products. Consumer believes that consuming of organic food helps to reduce stress level and maintain an energetic lifestyle. Another factor this study found that respondents are willing to pay even higher prices because of it is beneficial for health. Other researcher, Sivathanu in 2015 [18] also add and revealed that consumers prefer to buy organic food products because of their perception that the organic food products are healthy and safe, nutritious and environment friendly.

Pandurangarao et al. (2017) concluded ten factors such as labels, health, concern, environment concern, brand advertising, safety, accessibility, affordability, freshness and store location as influencing factors to buy organic food. Out of this health, environment and safety are key factors that are found primary influencers.

RESEARCH IN ORGANIC FOOD AN OVERVIEW

Earlier research has also shown country specific differences both in marketing of organic food and purchase frequencies of organic food (Tarkainen and Sundqvist, 2005). Baker et al. (2004) have concluded that although British and German consumers appear to hold very similar attitudes and beliefs regarding organic foods, the markets for organic food in each country have developed at markedly different rates. These country-wise differences

necessitate the need to undertake a country specific study in India for understanding the buying behavior of organic food purchasers. A C Nielsen's (Nielsen, 2006) study indicates that Indians are amongst the top 10 buyers of foods with 'health supplements' globally but lack access to organic food products. The study indicates Indians are keen to purchase organic food for their children but it suffers from poor availability and premium price perception. Organic food market in India is still at a nascent stage. Due to high logistic cost and low volume operation, organic foods are still costly. But it has started attracting health conscious people in large numbers and as a result a few retail stores are keeping organic food for their high-end customers. The domestic market is further characterized by inadequate retail presence; little certified branded produce and an incomplete range though marginal growth is slowly becoming evident. Only a few retail chains are involved in marketing organic food in Delhi national capital region (NCR) where the current study has been conducted. Accordingly, a study focusing on purchase behavior of organic food buyers in India may provide insights for the entirely nascent but emerging category and its stakeholders. There are at least two reasons for undertaking such a study. First, economic reforms in an emerging economy like India have led to a substantial increase in consumer income for affluent sections of the society and the corresponding demand for health and lifestyle oriented products.

Hence, potential for the category appears quite promising in the near future. Second, there is a lack of adequate information on purchase behavior of buyers of organic food in India.

Research related to consumer attitudes and preferences for organic produce is very sparse (Gil et al., 2000; Pearson, 2001; Squires et al., 2001; Magnusson et al., 2001; Chinnici et al., 2002; Harper and Makatouni, 2002; Conner, 2004; among others). Most research on consumer attitudes to organic food lack an explicit theoretical basis (Magnusson et al., 2001). It is also noted that consumer involvement is relatively higher for organic food (Grunert and Juhl, 1995; Pauri and Zanoli, 1996). Piirto (1992) and Flynn et al. (1996) indicate that green or environment friendly category might be especially appropriate for a study of opinion leadership and accordingly, this paper focuses extensively on the social system dimension, which is one of the main components of diffusion of innovation studies (Schiffman and Kanuk, 2004). Sriram and Forman (1993) argue that the organic product purchase is a matter of lifestyle choice by environmentally conscious consumers. It is a niche category and remains within the social system of target market of health focused consumers in India (Nielsen, 2006). This paper, which is part of a larger comprehensive study, focuses specifically on understanding the motivation and attitudes of Indian organic food buyers.

Finally, the time element is also incorporated in the study by analyzing different adopter categories. Related international papers have offered key insights for focusing the study.

Accordingly, our objectives in this study have been to:

- Determine the interrelationships between the chosen motivation and attitude constructs separately and the influences of demographics and time on the constructs
- Study the influence of these constructs on behavioral related characteristics like regular and occasional purchase of organic food categories

CONCLUSION AND FURTHER RECOMMENDATIONS

The purpose of this paper was to determine the consumers' perception regarding organic food in India. Understanding consumer's behavior and decision making towards organically grown products it has been found out that health, safe, taste and environmental concerns were the most important factors deciding consumer's attitude and preference towards purchasing organic products. Reviewing of study also revealed the availability of the market can influence consumer's preferences and choices for purchasing organic food products. This paper thus provides vital information that there will be more demand of the organically grown food products in coming future, so it's high time for producer, traders, consumer and government itself to focus over the niche market of organic.

Innovative people attach more importance to health, nutrition, taste and the need to look after unwell people motivations compared to non innovators. The importance attached towards the conviction about utility of organic food, reputation and certification are more or less at the same level between regular and occasional buyers and also between innovators and non innovators signifying that these requirements are more universal in nature. The number of categories bought by both regular and occasional buyers is correlated in a statistically significant and positive manner with health motivation. Number of categories bought regularly is also correlated with motivations of nutrition, taste and the need to look after unwell people and with none of the attitudes whereas number of categories bought occasionally is also correlated with conviction about utility attitude. The strongest motivations are health and nutrition for both types of buyers. Occasional purchasers attach more importance to curiosity motivation and regular buyers attach more importance to taste motivation.

REFERENCES

1. Ajzen, I. Aryal et al. Theory of planned behavior Organizational Behavior and Human Decision Processes 1991, 50:179-211. (2009)
2. Asli Ucar and Ayse Ozfer Ozcelik. in their article entitled “University Student Attitudes Toward Organic Foods” found out that the students’ 2009
3. Baker S, Thompson KE, Engelken J. mapping the values driving organic food choice. European, 2004
4. Blackwell, R. D., Miniard, P. W., & Engel, J. F. Consumer Behavior (10 ed.): Thomson South- Western, 2006
5. Bourn, D. and Prescott, J. A comparison of the nutritional value, sensory qualities and food safety of organically and conventionally produced foods. Critical Reviews in Food Science and Nutrition. 2002, 42(1): 1-34
6. Briz, T. & Ward, R.W. “Consumer awareness of organic products in Spain: an application of multinomial logit models”, Food Policy, Vol. 34 (3), 2009, pp. 295–304
7. Budi Suprapto and Tony Wijaya in their research work entitled “Model of Consumer’s Buying Intention towards Organic Food: A Study among Mothers in Indonesian” 201211
8. Chen, M.F. Consumer attitudes and purchase intentions in relation to organic foods in Taiwan: Moderating effects of food-related personality traits. Food Quality and Preference, Vol. 18, 2007, pp. (1008-1021), ISSN: 0950-3293
9. Balaji V, Injodey JI. Organic Food Products: A Study on Perceptions of Indian Consumers. Indian Journal of Marketing. 2017, 47(1).
10. Chiciudean D, Funar S, Arion F, Chirla G, Man A. The Factors of Influence over the Consumer Buying Behaviour for Organic Food. Bulletin UASVM Horticulture. 2017; 69 (2):68-71.
11. FAO, WHO. Codex Alimentarius: organically produced food. Third edition. 2007, Retrieved from: <http://www.codexalimentarius.org/standards/thematic-compilations/en/>
12. Hughner R, McDonagh S, Prothero ACJ, Shultz II Stanton J. Who are organic food consumers? A compilation and review of why people purchase organic food. Journal of consumer behavior. 2007; 6:1-17.

13. Laheri VK, Arya PK. A Study on Consumer Decision towards Purchase of Organic Food Products: A Case Study of Delhi. Indian Journal of Commerce & Management Studies. 2015; 6(2):84-87.
14. Lernoud J, Willer H. The World of Organic Agriculture. Statistics and Emerging Trends 2016. Bonn: Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, 2016.
15. Magnusson M, Arvola A, Koivisto Hursti U, Aberg L, Sjoden P. Attitudes towards organic foods among Swedish consumers. British Food Journal. 2001; 103(3):209-26.
16. Manaloor V, Srivastava D, Islam S. Growth of Organic Food Industry in India. AGROFOR International Journal. 2016; 1(2):69-76.
17. Mehra S, Ratna PA. Attitude and behavior of consumers towards organic food: an exploratory study in India. International Journal of Business Excellence. 2014; 7(6):677-696.
18. Mukul AZA, Afrin S, Hassan M. Factors affecting consumers' perceptions about organic food and their prevalence in Bangladeshi organic preference. Journal of Business and Management Sciences. 2013; 1:112-118.
19. National Program for Organic production Report, 2012.
20. Pandurangarao D, Chiranjeevi K, Rao DS. Factors Affecting Consumers to Buy Organic Food Products in Hyderabad and Secunderabad. International Journal of Business and Management Invention. 6(3), 24-30.
21. Paul J, Rana J. Consumer behavior and purchase intention for organic food. Journal of Consumer Marketing. 2012; 29:412-422.
22. Somasundram C, Razali Z, Santhirasegaram V. A Review on Organic Food Production in Malaysia. Horticulture. 2016; 2(12):1-5
23. Sangkumchalianga P, Huang WC. Consumers Perceptions and Attitudes of Organic Food Products in Northern Thailand. International Food and Agribusiness Management Review. 2012; 15(1):87-102.
24. United States Department of Agriculture (USDA). Retrieved from http://agritech.tnau.ac.in/org_farm/orgfarm_introduction.html
25. Wier M, Andersen LM, Millock K. Consumer demand for organic foods - attitudes, values and purchasing", paper presented at SOM Workshop, Environment, Information and Consumer, Frederiksdal, April, 2003.

26. Yadav AK. Organic Agriculture, Concept, Scenario, Principles and Practices. Director National Centre of Organic Farming, Ghaziabad National Centre of Organic Farming Department of Agriculture and Cooperation, Ministry of Agriculture, Govt of India, Uttar Pradesh, 2010
27. Von Alvensleben, R. and Altmann, M. 1987. Determinants of the demand for organic food in Germany. *Acta Horticulture*, 202:235-43
28. Wandel, M. and Bugge, A. 1997. Environmental concern in consumer evaluation of food quality. *Food Quality and Preference*, 8(1):19-26.
29. Willer, H., and Yussefi, M. 2004. The World of Organic Agriculture: Statistics and Emerging Trends 2004. International Federation of Organic Agriculture Movements, Bonn, Germany.
30. Zanoli, R. and Naspetti, S. 2002. Consumer motivations in the purchase of organic food – A means end approach. *British Food Journal*, 104(8/9):643-653.

A SYSTEMATIC REVIEW OF LITERATURE STUDY ON DIGITAL AGRICULTURAL MARKETING SERVICES

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ABSTRACT

Agriculture marketing is inferred to cover services involved in moving an agriculture product from the farm to the target consumer. Agriculture marketing system has undergone several changes over the last 60 years owing to the increased marketed surplus, increase in urbanization and income levels and consequent changes in the pattern of demand for marketing services; increase in linkages with distant and overseas markets. The main objective of agriculture marketing is to reduce the cost of marketing. Use of information and communication technology (ICT) in agricultural sector can be called as e-Agriculture or e-Agribusiness. Digitalization will change every part of agri food chain but require major transformations in farming, rural economics, marketing of produce. The application of ICT in agriculture has positive effects for farmers in terms of accessing market information and promoting agricultural products. In digital world, we can revolutionize agriculture market end to end digitally. ICT helps small farm holders to find multiple buyers for producer who are willing to pay high price. Small holders deal with only handful buyers who either pickup directly from them. Use of mobile application providing price information to farmers can reduce market distortions. In the Global scenario in Kenya m-Farm mobile applications are enabling collective sales where users can find location of farmers, input dealers, buyers, warehouse for storage, credit etc and it reported that farmers are receiving higher prices in market. In China's agricultural industry, traditionally farmers plan their crop based on sales of previous season. With Alibaba's flash sale and marketing platform 'Juhuasuan' its virtual farming feature "Jutudi" allowing farmers access to consumer sales data so that they can more accurately plan crops based on current consumer trends. It lets consumer's pre order

agriculture products before harvest. It directly works with cooperatives and farmers to bypass middlemen. Uzhavan app by government of Tamilnadu for marketing of produce as one of service offered and many other digital apps by other state government for letting the farmers get to know about the timely and proper information for the crop production and the market details. This article gives idea about current digital services in marketing of agriculture produce

Keywords: Agriculture, Produce, Marketing, Digital Marketing, Information communication technology.

INTRODUCTION

India is an agricultural country that depends on agriculture sector directly or indirectly. India laid much emphasis on agriculture production with world ranking of second in rice, fruits, vegetables after China. Marketing plays eminent role in reach of agriculture produce to consumers, selling of output, fetching good price, creating relationships, satisfying customers. Agriculture marketing is inferred to cover services involved in moving an agriculture product from the farm to the target consumer. It helps in planning, organizing, grading, packing, storage, food processing, distribution and advertising. Agriculture marketing system has undergone several changes over the last 60 years owing to the increased marketed surplus, increase in urbanization and income levels and consequent changes in the pattern of demand for marketing services; increase in linkages with distant and overseas markets. The main objective of agriculture marketing is to reduce the cost of marketing. Agricultural Information Technology is one of the important factors that lead to the expected development. Use of information and communication technology (ICT) in agricultural sector can be called as e-agriculture or e-agribusiness. Digitalization will change every part of agri food chain but require major transformations in farming, rural economics, and marketing of produce. The application of ICT in agriculture has positive effects for farmers in terms of accessing market information and promoting agricultural products.

LITERATURE REVIEW

The benefits to farmers by sale of agricultural produce in the regulated market varies from area to area because of the variation in the spread of regulated markets over the regions and the existence of necessary infrastructural amenities/ facilities in these regulated markets (Jairath, M. S,2012).Information and communication technology(ICT) solution in agriculture

marketing helps to evaluate ,plan, deploy impactful interventions to facilitate smallholder marketing (USAID FACET project,2012).Retail marketing of agriculture commodities through initiatives made by multinational companies did not attempt to explain how extension services to farmers are linked to information technology (Bihu Santosh behera,et al). License for Electronic Spot Exchange has also been granted to National Spot Exchange Ltd (NSEL), NCDEX Spot Exchange Ltd. (NSPOT) and National Agriculture Produce Marketing Committee of India Ltd. (NAPMC) as spot exchange helps to remove intermediaries (Surarchith,N.K.et al.,2013).Agricultural marketing functionaries, marketing of agriculture produce, importance of agriculture produce (Ms.K.Kiruthiga,et al.,2015). Few prominent private sector organizations adopted different models for agricultural Marketing (V.Nagendra 2015).Telephone is used as means of communication for marketing of produce in India. Number of mobile enable services is addressing the information needs of the stakeholders to some extent (Singh,U.S., 2013).Experience and the potential of agribusiness franchising of commodities in India is growing at a rapid extent and the interest among the people for agro start ups is more (Sukhpal Singh.,2014).The scope of Indian agriculture marketing systems, major private sector initiatives are reviewed (Shakeel- Rehman, et al., 2012).

Internet has proved its capabilities for many of individuals and organizations for the marketing of their products. Objective of internet in any business is to expand the business to maximum customers and to minimize the efforts in the distribution channel. Developing the use of internet in business is not easy task for the organizations as they are required to establish the totally new and different marketing strategies. Paulrajan Rajkumar and Fatima Jacob conducted a study to report the finding from the study on business models for vegetable retailers in both unorganized and organized retailing. Entry of organized retail in India in a vegetable marketing has impacted the whole spectrum of supply chain practices. Organized retail trade has improved the supply of vegetables from cultivation to consumption. As the Indian retail sector is still in its budding stage. The economic liberalization policies and globalization had exploded country's economy for faster growth. The development of organized retailing has been initiated in a big way by the entry of corporate, both domestic and global in term of FDI. Nigerian farmers are facing problem in marketing their products beyond their locality. Information technology tools have been verified and accepted commonly to answer the problem of marketing faced by farmers. In the present era of globalization, trade liberalization and privatization, Information Technology

(IT) plays a dynamic role to make agro-products competitive in the global market through all its appearances like e-mail, e-banking, internet, and e-commerce. Internet is the fastest developing communication medium on earth at present. Doing agribusiness online through internet is generally referred as "E-agribusiness". It is also referred as solicitation of e-commerce in agribusiness. Considering the Indian agricultural marketing; ITC has given a good attempt for the direct marketing of agricultural commodities using its own designed "e-choupal" model. The company has initiated an "E-choupal" model in which they places computers with Internet access in villages; the "e-choupal" serve as both a social gathering place for exchange of information and an e-commerce hub. This has begun an effort to re-engineer the procurement process for soya, tobacco, wheat, shrimp, and other cropping systems. With the help of this system in rural, ITC has created a highly profitable supply and procurement design channel for the company. An e-commerce platform that is also a low-cost fulfillment system focused on the needs of rural India. The "e-choupal" system has also catalyzed rural change; that is helping to improve rural remoteness, create more transparency for farmers, and improve their productivity and income. Self-help groups in India have started marketing their products beyond their localities with the help of information technology. They have accepted merchant's website as the medium between SHG and end users of the agricultural products. Consumers are able to put their orders online for agricultural good which are directly executed by SHG. According to Dr. Rajendra in Asia Pacific Journal of Research, there are number of challenges associated with marketing of agricultural harvest. Farmers are having limited access to the market information. Literacy level among the farmers particularly in India is very low; multiple channels of distribution consume away the profit share of farmers. There are too many intermediaries who share the farmer's profit. Although we say that technology has improved but it has not gone to the rural levels

INFORMATION AND COMMUNICATION TECHNOLOGY SOLUTIONS TO ENHANCE AGRICULTURE MARKETING

Current Agricultural marketing system globally is the outcome of several years of Government intervention. In digital world, we can revolutionize agriculture market end to end digitally. ICT helps small farm holders to find multiple buyers for producer who are willing to pay high price. Small holders deal with only handful buyers who either pickup directly from them. Use of mobile application providing price information to farmers can reduce market distortions. In the Global scenario in Kenya m-Farm mobile applications are

enabling collective sales where users can find location of farmers, input dealers, buyers, warehouse for storage, credit etc and it reported that farmers are receiving higher prices in market.

Technologies such as ‘Blockchain’ are used to detect poor quality food in food chain allowing early and effective responses. It provides competitive advantage for those who use it with information on origin of their food to consumers. Walmart is using blockchain to track every bag of lettuce and spinach from farm .Over 100 farms that supply Walmart with leafy green vegetables will be required to input information about their food into blockchain database. It helps to ensure quality of its fresh food to customers. Private sector initiatives that are successfully disseminating information to the farmers on a daily basis.

Technology innovations are increasing efficiency in China’s agricultural industry. Traditionally, farmers plan their crop based on sales of previous season. With Alibaba’s flash sale and marketing platform ‘Juhuasuan’ it’s virtual farming feature “Jutudi” allowing farmers access to consumer sales data so that they can more accurately plan crops based on current consumer trends. It lets consumer’s pre order agriculture products before harvest. It directly works with cooperatives and farmers to bypass middlemen. Consumers are enjoying discounts of 30% to 50% lower than regular prices. Chinese e-commerce platform like ‘Pinduoduo’ is running similar virtual farming feature called “Duo Duo orchard” introduced in 2018 with currently more than 11 million active users a day. In India e-choupal by ITC, AGMARKNET, M & M, Godrej group, APMC etc play a vital role for welfare of farmers Agricultural products range from staple to high-value crops; however, there is an emphasis on cash crops that are marketed by smallholder producers and provide income to support rural households.

E-CHOUPAL

It is an initiative by Indian Tobacco Company limited (ITC) in the year 2000. E-Choupal links rural farmers via internet for procurement of agriculture and aquaculture products like coffee, soyabean, prawns etc. ITC will provide computers, internet access in rural area where farmers can directly negotiate price and sale. Farmers obtain information on mandi prices, good farming practices, weather forecast, placing orders for agriculture inputs(seeds, fertilizers). ITC kiosk is run by sanchalak (a literate and trained farmer). The computer is placed in sanchalaks home and is linked to internet. Each kiosk can serve 600 farmers in surrounding 10 villages within 5km radius. It eliminates middlemen completely. Since

introduction of e-Choupal services farmers have seen raise in their income levels. At present 6100 e-Choupal's are in operation over 35000 villages in 10 states.

RELIANCE GROUP

It is planning to acquire over 2000 acres for its contract farming venture in Karnataka, which could emerge as one of its hub for farm produce exports. In the pipeline it is going to setup warehouses across the state. Reliance fresh stores-the first format from reliance retail would source fresh fruits and vegetables where farmers get large benefits by selling directly to reliance, thus saving on transportation expenses.

AGMARKNET

Agricultural Marketing information network is a sponsored project of Directorate of Marketing and Inspection (DMI) to establish a nationwide information network for speedy collection and diffusion of price, commodities, sales, arrival information, contract farming. It started in march 2000 by union ministry of agriculture. It links around 7000 agriculture wholesale markets in India. Portal is in 8 regional languages and English. More than 3200 markets are covered under this with more than 350 commodities.

E-NAM

Electronic trading portal integrating 585 markets across 16 states. More than 164.53 lakh tonnes of farm commodities have been transacted on e-NAM. It is developed to transport the agri product from one market to another in smooth way to save the produce.

NAFED

National Agricultural Co-operative Marketing Federation of India (NAFED) is the apex body of the cooperative marketing system at the National level. One of oldest and successful association/cooperation of farmers was Grape Growers Association of Maharashtra. NAFED set up in 1958 promotes cooperative marketing of agricultural produce for the benefit of farmers through its own branches and the cooperative marketing network. It collects agro products directly from farmers in regulated markets eliminating middleman.

IKISAN

The only entity that is specialized across the agri value chain with specific mandate and capabilities to harness the power of Information Technology. It provides information on market prices, products, weather, management techniques etc.

Cargill provide assured marketing outlet without commission and brokerage. It is a private sector initiative aiming to squeeze out market inefficiencies and intermediaries in agriculture marketing. Khadi gramodyog board of Madhya Pradesh and Hindustan Unilever Limited entered into public private partnership. It is a joint venture with umbrella brand ‘Vindhya valley’. Milk cooperative society called ‘Warna Bazaar’ in Kolhapur of Maharashtra has more than 40 outlets running as one stop store for agriculture products. Mahindra and Mahindra group initiative called Mahindra Krishi Vihar in madhurai in the year 2000 for providing agriculture extension services and buyers a lot of produce from farmers. Aadhaar retail stores by Godrej and Future group in Gujarat and Punjab states who procure directly from farmers for their stores. Other websites like krishivihar.com, agriwatch.com, commodityindia.com also provide market information. India of uses social media to organize and empower small farmers. Small tea growers in West Bengal India launched a website last year and linked it with Facebook and Twitter to connect growers directly with international buyers. Another example, turmeric farmers in Maharashtra's Sangli district used Facebook's Mobile Messenger to organize themselves and avoid a potentially calamitous price crash due to oversupply. They were able to reach thousands of turmeric farmers.

UZHAVAN APP

Tamilnadu government launched bilingual (Tamil and English) mobile application in a bid to use technology benefit to farmers. It offers 12 key agricultural services to farmers including real time information on crop prices, marketing linkages.

NAPANTA APP

Digital agricultural platform to address the inefficiencies in pre harvest management for agri produce with superior market linkages across villages in Telangana and Andhra Pradesh. Farmer can access real time information pertaining to daily market prices of 3500+agri markets and 3 year price trend of 300+commodities. It is bilingual with Telugu and English.

COOPERATIVE MOVEMENT IN INDIA

Cooperatives came into existence as people have common needs, the producers, the consumers, the workers, the borrowers, the suppliers/distributors felt that they could themselves fulfill through their joint effort and investment. The ultimate aim of the cooperatives is to earn for the welfare of its members, who uses its services has an equal say in its affairs, members of the cooperative share profit and loss in proportion to utilization of services. In India cooperative marketing was one of the efforts to fetch better prices for the produce. Reserve Bank of India gave an institutional definition of cooperative marketing and defined a cooperative marketing society as “an association of cultivators formed primarily for the purpose of helping the members to market their produce more profitably than possible through private trade.

National Agricultural Cooperative Marketing Federation of India Limited set up in 1958 promotes cooperative marketing of agricultural produce for the benefit of farmers through its own branches and the cooperative marketing network. It collects agro products directly from farmers in regulated markets eliminating middleman. In India, ongoing initiatives in coordination have resulted in simultaneous action in three areas-evolutions of commodity and industry, evolution of supply chain integrated technology models and promotion regulation of these mechanisms. Anand Pattern Cooperatives (APC) is one such model which achieved success in development of India's dairy industry. The Chicory contract farming coordination which started in 1956 in Jamnagar Gujarat is also a successful result. Kerala Horticulture Development Program (KHDP) is also one of the successful agricultural development projects in the country. It has helped 41,000 vegetable and fruit farmers through 1886 Self-Help-Groups (SHG's).

CONCLUSION

Smartphones could be a true breakthrough for smallholder farmers where apps are used for agricultural marketing. It creates an awareness on the market prices and the demand of the crop produce. Despite all these opportunities, it is worthwhile reinforcing the fact that there is no single best solution for all circumstances. More refined marketing skills will likely reap more benefits than without. Agriculture extension mechanism is becoming dependent on IT to provide appropriate answers to farmers. To encourage digital agripreneurship, companies need to create pool of digitally skilled employees. Young agripreneurs have a key role to play in digitization of agriculture sector. The government and many companies are investing in

agriculture marketing solution for welfare of farmers. Digital Agricultural Marketing will play a vital role in the years to come in doubling the farmers produce and tripling the Income of the farmers.

REFERENCE

- Bibhu Santosh Behera.,Babita Panda., Rudra Ashish Behera., Narayan Nayak.,Anama Charan Beherae S.Jena.(2015). Information Communication Technology Promoting Retail Marketing In Agriculture Sector in India as a Study.
- International Conference on Intelligent Computing, Communication & Convergence Procedia Computer Science 48 (2015) 652 – 659
- Jairath,M.S., Hema Yadav.2012.Role of ICT in Decision Making in Agricultural Marketing, Ind. Jn. of Agri. Econ. Vol.67, No.3
- Ms.Kiruthiga.K.,Dr.Karthi.R.,Ms.Asha.B., Daisy.2015.Agricultural marketing –An overview, International Journal of Scientific and Research Publications, Volume 5, Issue 4, ISSN 2250-3153
- Nagendra,V.,2015.Private Sector Initiatives in Agricultural Marketing in India, M. S. Ramaiah university of applied sciences publication
- Shakeel-Ul-Rehman., Selvaraj.M. Syed Ibrahim.M.,2011.Indian agriculture marketing-An Overview Asian Economic and Social Society. ISSN(P): 2304-1455/ ISSN(E): 2224-4433
- Singh,U.S.,Mishra,U.S.,2015.,Marketing Agricultural Produces Journal of Marketing and Consumer Research ISSN 2422-8451 An International Peer-reviewed JournalVol.16, 2015
- Singh,U.S.,2011. Marketing Agricultural Produces Journal of Marketing and Consumer Research ISSN 2422-8451 An International Peer-reviewed JournalVol.16, 2015
- Sukhpal Singh and Naresh Singla, (2010), Fresh Food Retail Chains in India: Organisation and Impacts, CMA Publication No – 238
- Ernst and Ehmke, Ecommerce in Agribusiness research project, The Ohio State University (2000).
- http://www.domainb.com/economy/agriculture/20040713_marketing.html 3/4/2016-12.01

- http://www.domainb.com/economy/agriculture/20040713_marketing.html3/4/2016-12.01
- http://www.domainb.com/economy/agriculture/20040713_marketing.html 3/4/2016-12.01
- <http://www.thehindu.com/news/national/karnataka/unified-online-market-for-agriculturalproduce-is-a-reality/article5717197.ece10/4/2016-12.01>

AGRICULTURAL PROBLEMS OF INDIA AND THEIR POSSIBLE SOLUTIONS

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ABSTRACT

Agriculture is the science and art of cultivating plants and livestock. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years ago.

Keywords: Agriculture, Problem, Solution, India

INTRODUCTION

Agricultural sector plays a strategic role in the process of economic development of a country. It has already made a significant contribution to the economic prosperity of advanced countries and its role in the economic development of less developed countries is of vital importance.

In other words, where per capita real income is low, emphasis is being laid on agriculture and other primary industries. Increase in agricultural production and the rise in the per-capita income of the rural community, together with the industrialisation and urbanisation, lead to an increased demand in industrial production.

MAJOR AGRICULTURAL PROBLEMS OF INDIA AND THEIR POSSIBLE SOLUTIONS

1. SMALL AND FRAGMENTED LAND-HOLDINGS

The seemingly abundance of net sown area of 141.2 million hectares and total cropped area of 189.7 million hectares (1999-2000) pales into insignificance when we see that it is divided into economically unviable small and scattered holdings.

The average size of holdings was 2.28 hectares in 1970-71 which was reduced to 1.82 hectares in 1980-81 and 1.50 hectares in 1995-96. The size of the holdings will further decrease with the infinite Sub-division of the land holdings.

The problem of small and fragmented holdings is more serious in densely populated and intensively cultivated states like Kerala, West Bengal, Bihar and eastern part of Uttar Pradesh where the average size of land holdings is less than one hectare and in certain parts it is less than even 0.5 hectare.

Rajasthan with vast sandy stretches and Nagaland with the prevailing ‘Jhoom’ (shifting agriculture) have larger average sized holdings of 4 and 7.15 hectares respectively. States having high percentage of net sown area like Punjab, Haryana, Maharashtra, Gujarat, Karnataka and Madhya Pradesh have holding size above the national average.

Further it is shocking to note that a large proportion of 59 per cent holdings in 1990- 91 were marginal (below 1 hectare) accounting for 14.9 per cent of the total operated area. Another 19 per cent were small holdings (1-2 hectare) taking up 17.3 per cent of the total operated area.

Large holdings (above 10 hectare) accounted for only 1.6 per cent of total holdings but covered 17.4 per cent of the operated area (Table 22.1). Hence, there is a wide gap between small farmers, medium farmers (peasant group) and big farmers (landlords).

The main reason for this sad state of affairs is our inheritance laws. The land belonging to the father is equally distributed among his sons. This distribution of land does not entail a collection or consolidated one, but its nature is fragmented.

Different tracts have different levels of fertility and are to be distributed accordingly. If there are four tracts which are to be distributed between two sons, both the sons will get smaller plots of each land tract. In this way the holdings become smaller and more fragmented with each passing generation.

Sub-division and fragmentation of the holdings is one of the main causes of our low agricultural productivity and backward state of our agriculture. A lot of time and labour is wasted in moving seeds, manure, implements and cattle from one piece of land to another.

Irrigation becomes difficult on such small and fragmented fields. Further, a lot of fertile agricultural land is wasted in providing boundaries. Under such circumstances, the farmer cannot concentrate on improvement.

The only answer to this ticklish problem is the consolidation of holdings which means the reallocation of holdings which are fragmented, the creation of farms which comprise only one or a few parcels in place of multitude of patches formerly in the possession of each peasant.

But unfortunately, this plan has not succeeded much. Although legislation for consolidation of holdings has been enacted by almost all the states, it has been implemented only in Punjab, Haryana and in some parts of Uttar Pradesh.

Consolidation of about 45 million holdings has been done till 1990-91 in Punjab, Haryana and western Uttar Pradesh. The other solution to this problem is cooperative farming in which the farmers pool their resources and share the profit.

2. SEEDS

Seed is a critical and basic input for attaining higher crop yields and sustained growth in agricultural production. Distribution of assured quality seed is as critical as the production of such seeds. Unfortunately, good quality seeds are out of reach of the majority of farmers, especially small and marginal farmers mainly because of exorbitant prices of better seeds.

In order to solve this problem, the Government of India established the National Seeds Corporation (NSC) in 1963 and the State Farmers Corporation of India (SFCI) in 1969. Thirteen State Seed Corporations (SSCs) were also established to augment the supply of improved seeds to the farmers.

High Yielding Variety Programme (HYVP) was launched in 1966-67 as a major thrust plan to increase the production of food grains in the country.

The Indian seed industry had exhibited impressive growth in the past and is expected to provide further potential for growth in agricultural production: The role of seed industry is not only to produce adequate quantity of quality seeds but also to achieve varietal diversity to suit various agro-climatic zones of the country.

The policy statements are designed towards making available to the Indian farmer, adequate quantities of seed of superior quality at the appropriate time and place and at an affordable price so as to meet the country's food and nutritional security goals.

Indian seeds programme largely adheres to limited generation system for seed multiplication. The system recognises three kinds of generation, namely breeder, foundation and certified seeds. Breeder seed is the basic seed and first stage in seed production. Foundation seed is the second stage in seed production chain and is the progeny of breeder seed.

Certified seed is the ultimate stage in seed production chain and is the progeny of foundation seed. Production of breeder and foundation seeds and certified seeds distribution have gone up at an annual average rate of 3.4 per cent, 7.5 per cent and 9.5 per cent respectively, between 2001-02 and 2005-06).

3. MANURES, FERTILIZERS AND BIOCIDES

Indian soils have been used for growing crops over thousands of years without caring much for replenishing. This has led to depletion and exhaustion of soils resulting in their low productivity. The average yields of almost all the crops are among the lowest in the world. This is a serious problem which can be solved by using more manures and fertilizers.

Manures and fertilizers play the same role in relation to soils as good food in relation to body. Just as a well-nourished body is capable of doing any good job, a well nourished soil is capable of giving good yields. It has been estimated that about 70 per cent of growth in agricultural production can be attributed to increased fertilizer application.

Thus increase in the consumption of fertilizers is a barometer of agricultural prosperity. However, there are practical difficulties in providing sufficient manures and fertilizers in all parts of a country of India's dimensions inhabited by poor peasants. Cow dung provides the best manure to the soils.

But its use as such is limited because much of cow dung is used as kitchen fuel in the shape of dung cakes. Reduction in the supply of fire wood and increasing demand for fuel in the rural areas due to increase in population has further complicated the problem. Chemical fertilizers are costly and are often beyond the reach of the poor farmers. The fertilizer problem is, therefore, both acute and complex.

It has been felt that organic manures are essential for keeping the soil in good health. The country has a potential of 650 million tonnes of rural and 160 lakh tonnes of urban compost which is not fully utilized at present. The utilization of this potential will solve the twin problem of disposal of waste and providing manure to the soil.

The government has given high incentive especially in the form of heavy subsidy for using chemical fertilizers. There was practically no use of chemical fertilizers at the time of Independence As a result of initiative by the government and due to change in the attitude of some progressive farmers, the consumption of fertilizers increased tremendously.

In order to maintain the quality of the fertilizers, 52 fertilizer quality control laboratories have been set up in different parts of the country. In addition, there is one Central Fertilizer Quality Control and Training Institute at Faridabad with its three regional centres at Mumbai, Kolkata and Chennai.

Pests, germs and weeds cause heavy loss to crops which amounted to about one third of the total field produce at the time of Independence. Biocides (pesticides, herbicides and weedicides) are used to save the crops and to avoid losses. The increased use of these inputs has saved a lot of crops, especially the food crops from unnecessary wastage. But indiscriminate use of biocides has resulted in wide spread environmental pollution which takes its own toll.

4. IRRIGATION

Although India is the second largest irrigated country of the world after China, only one-third of the cropped area is under irrigation. Irrigation is the most important agricultural input in a tropical monsoon country like India where rainfall is uncertain, unreliable and erratic India cannot achieve sustained progress in agriculture unless and until more than half of the cropped area is brought under assured irrigation.

This is testified by the success story of agricultural progress in Punjab Haryana and western part of Uttar Pradesh where over half of the cropped area is under irrigation! Large tracts still await irrigation to boost the agricultural output.

However, care must be taken to safeguard against ill effects of over irrigation especially in areas irrigated by canals. Large tracts in Punjab and Haryana have been rendered useless (areas affected by salinity, alkalinity and water-logging), due to faulty irrigation. In the Indira Gandhi Canal command area also intensive irrigation has led to sharp rise in sub-soil water level, leading to water-logging, soil salinity and alkalinity.

5. LACK OF MECHANISATION

In spite of the large scale mechanisation of agriculture in some parts of the country, most of the agricultural operations in larger parts are carried on by human hand using simple and conventional tools and implements like wooden plough, sickle, etc.

Little or no use of machines is made in ploughing, sowing, irrigating, thinning and pruning, weeding, harvesting threshing and transporting the crops. This is specially the case with small and marginal farmers. It results in huge wastage of human labour and in low yields per capita labour force.

There is urgent need to mechanise the agricultural operations so that wastage of labour force is avoided and farming is made convenient and efficient. Agricultural implements and machinery are a crucial input for efficient and timely agricultural operations, facilitating multiple cropping and thereby increasing production.

CONCLUSION

In the course of economic development, agriculture employs majority of people. This means raising the level of the national income and standard of living of the common man.

The rapid" rate of growth in agriculture sector gives progressive outlook and further motivation for development. As a result, it helps to create proper atmosphere for general economic development of the economy. Thus, economic development depends on the rate at which agriculture grows.

REFERENCE

- <Https://www.ippmedia.com/en/features/importance-agricultural-sector-country %e2%80%99s - economic-development>
- <Http://www.yourarticlery.com/agriculture/10-major-agricultural-problems-of-india-and-their-possible-solutions/20988>

STATUS OF AGRICULTURE IN INDIA

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ABSTRACT

Agriculture is popularly called as ‘backbone of the Indian economy’ from very long time. Before wide urbanization, farmers were having very large agricultural land, using which they used to produce sufficient food for the whole nation. Long back there was less population. In recent decades, in order to develop the nation, urbanization took place, agricultural lands were acquired by government to develop infrastructure, and population of India is largely increasing, sufficient crop produce is unavailable, pollution is increasing, climate change, all leading to unhealthy life and unhealthy environment. There is a need to substantially explain the status of agriculture in India, to the people to create awareness. Therefore, in this paper the status of agriculture in India is presented.

Keywords: Agriculture, Agriculture Policies, Population Pressure, Productivity, Technology

INTRODUCTION

The agriculture sector is a prominent part of the Indian economy. It supports about 50% of India’s workforce, and occupies more than one third of the country’s total geographical area. The sector continues to be the single largest contributor to the Indian economy even though its contribution to GDP has declined since the country’s independence in 1947. The cropping pattern in India has undergone significant changes over time. As the cultivated area remains, more or less, constant, the increased demand for food because of increase in population and urbanization puts agricultural land under stress resulting in crop intensification and substitution of food crops with commercial crops.

LITERATURE REVIEW

Anwesha Borthakur and Pardeep Singh (2012), “Agricultural Research in India: An Exploratory Study” This article intended to portray the role of Five Year Plans regarding investment, technology transfer and other aspects related to agricultural development in India and also trace the development of agricultural research in India. The result showed that Five Year Plan plays a major role in developing agriculture

Himani (2014), “An Analysis of Agriculture Sector in Indian Economy” The objective of this article was to analyze the role of agriculture sector in Indian economy. The outcome of the study reveals that agriculture sector has achieved tremendous growth, contributions to GDP, employment considerably.

Kekane Maruti Arjun (2013), “Indian Agriculture – Status, Importance and Role in Indian Economy” The purpose of this research was to understand the importance, explore the role and present the status of Indian agriculture. The result showed that even though agriculture has benefited from improved farming techniques, but the growth is not equitable.

OBJECTIVE

- To analyze the status of agriculture in India

RESEARCH METHODOLOGY

This research is conceptual in nature and is based on secondary data. The secondary data is collected from journals, various statistics is collected from official websites.

DISCUSSION AND FINDINGS

AGRICULTURE IN INDIA

Agriculture is an essential link in the supply chain of the manufacturing sector, and plays an important role in the rural development of the country. Some of the major agricultural crops produced in India are rice, coarse cereals, pulses, oilseeds, sugarcane, cotton, jute and mesta. Over the past five years, the agriculture sector has seen significant increase in production of food grains, oil seeds commercialized crops fruits, vegetables, poultry and dairy. Overall, agriculture and agro based products have become the largest

consumption category in India. In addition, India is one of the major exporters of cashews and spices as well as one of the major producers of milk in the world.

India has made impressive strides on the agricultural front during the last three decades. Much of the credit for this success should go to the several million small farming families that form the backbone of Indian agriculture and economy. Policy support, production strategies, public investment in infrastructure, research and extension for crop, livestock and fisheries have significantly helped to increase food production and its availability. Increased agricultural and rapid industrial growth in the recent years has contributed to a significant reduction in poverty level. Despite the impressive growth and development, India is still home to the largest number of poor people of the world. The depth of hunger among the undernourished is also high. India has high population pressure on land and other resources to meet its food and development needs. The natural resource base of land, water and biodiversity is under severe pressure.

ROLE OF AGRICULTURE IN INDIAN ECONOMY

- Share in national income
- Largest employment providing sector
- Contribution to capital formation
- Providing raw material to industries
- Market for industrial products

EMERGING TRENDS

1. The agriculture sector recorded satisfactory growth due to improved technology, irrigation, inputs and pricing policies.
2. Livestock, poultry, fisheries and horticulture are surging ahead in production growth in recent years and will have greater demand in the future.
3. Despite the structural change, agriculture still remains a key sector, providing both employment and livelihood opportunities to more than 70% of the country's population who live in rural areas.

4. The contribution of small farmers to the national and household food security has been steadily increasing.
5. The water availability for agricultural uses has reached a critical level and deserves urgent attention of all concerned.
6. Vast uncommon opportunities to harness agricultural potential still remain, which can be tapped to achieve future targets.
7. There are serious gaps both in yield potential and technology transfer as the national average yields of most of the commodities are low, which if addressed properly could be harnessed.
8. Concentration was on enhanced production of a few commodities like rice and wheat, which could quickly contribute to increased total food and agricultural production.
9. This era also witnessed rapid loss of soil nutrients, agro-biodiversity including indigenous land races and breeds.

ISSUES IN AGRICULTURE THAT NEED TO BE ADDRESSED

1. Population pressure and demographic transition
2. Resource base degradation and water scarcity
3. Investment in agriculture, structural adjustment and impact on the poor
4. Globalization and implication on the poor
5. Modern science and technology and support to research and technology development
6. Rapid urbanization and urbanization of poverty, and deceleration in rural poverty reduction
7. Conservation on natural resources and protection of environment
8. Vast untapped potential of soil and water resources, and farming systems
9. Technology revolution especially in the areas of molecular biology, biotechnology, space technology, ecology and management
10. Revolution in informatics and communication and the opportunity of linking farmers, extension workers and scientists with the national and international databases

STATUS OF AGRICULTURE IN INDIA

1. During the month of November, 2017 the All India Index Number of Wholesale Price of Food grains decreased by 0.98% from 143.1 in September, 2017 to 141.7 in October 2017.
2. The Wholesale Price Index (WPI) Number of cereals decreased by 0.14% from 142.6 to 142.4 while WPI of pulses decreased by 4.68% from 145.2 to 138.4 during the same period.
3. Out of total 36 meteorological Sub-divisions, 06 subdivisions received large excess rainfall, 13 subdivisions received normal rainfall and 17 subdivisions received deficient rainfall.
4. Central Water Commission monitors 91 major reservoirs in the country which have total live capacity of 161.99 Billion Cubic Meter (BCM) at Full Reservoir Level (FRL).
5. The growth rate of Gross Domestic Product (GDP) at constant market prices was 6.3% as compared to 7.5% in the previous year.
6. The growth rate of Gross Value Added (GVA) at constant basic prices for 2017-18 was 6.1% as compared to 6.8% in the previous year.
7. As per the provisional estimates of national income for the 2016-17, the growth of GDP at constant prices was 7.1% in 2016-17 and the growth rate of GVA at constant basic prices for 2016-17 was 6.6%.
8. The fixed investment rate declined from 27.1% to 26.4% during 2017-18.
9. As per the 1st Advance Estimates released by Ministry of Agriculture, Cooperation and Farmers Welfare, production of kharif food grains during 2018-19 is estimated at 136.8 million tons.

10. Procurement of rice as on 1st November 2019 during kharif marketing season was 15.9 million tones.
11. Centre increased the agricultural education budget this year by 47.4% as compared to the financial year 2017-18.
12. Geographically, India has the second largest arable area, and as many as 127 diverse agro-climatic zones, thereby giving India global leadership in several crops.
13. Indian approach to partnership with African nations in agriculture is driven by the aim of South-South Cooperation through research and development, capacity building, access to Indian market, and support to Indian investment in agriculture in Africa.

- 14.** India and ICARDA have had a long-standing collaboration in the field of agricultural research and development, which has only strengthened significantly over the years.
- 15.** India and Italy signed a new MoU for cooperation in Agriculture and Phytosanitary issues.
- 16.** Some estimates show that Food grain demand of country is expected to reach 355 million tons 2030 as compared to 250 million tons in 2016. Therefore, there is a need to build a future ready Agriculture- by plugging the existing gaps.
- 17.** Ministry of Agriculture and Farmers Welfare is working on mission of doubling farmers' income by 2022 and farm machinery is an important constituent of it.
- 18.** The presence of 180 buyers from over 40 countries at EIMA AGRIMACH 2017 will certainly give a big push to the international trade in farm machinery.
- 19.** Overall fish production in the country increased from 0.75 million ton in 1950-51 to 11.41 million ton in 2017-18.
- 20.** Hon'ble Prime Minister of India has given a slogan of "Doubling the Farmer's Income" with a vision to ensure overall development of the country.
- 21.** The main aim of government is to double the income of fishers and fish-farmers by 2022 through implementation of "Blue Revolution".
- 22.** India to contribute to Nigerian Government's priorities in the field of agriculture and allied sectors.
- 23.** The Department of Agriculture, Cooperation & Farmers Welfare has proposed a new integrated programme, called National Programme on use of Space Technology for Agriculture (NPSTA), envisaging integrated use of Space and Geospatial Tools for Mapping, Monitoring and Management of Agriculture.
- 24.** Milk production increased from 17-22 million tons in 1960 to 163.7 million tons in 2017-18.
- 25.** Rabi crops sowing crosses 565 lakh hectare.
- 26.** Reforms in agriculture sector by Niti Ayog- The government is aware of the roadmap outlined by NITI Ayog for reforms in agriculture sector and doubling farmers' income by 2022. The roadmap presents a quantitative framework for doubling farmers' income which has identified seven of growth. These are:
- a. Increase in productivity of crops
 - b. Increase in production of livestock
 - c. Improvement in efficiency of input use

- d. Increase in crop intensity
- e. Diversification towards high value crops
- f. Improved price realization by farmers
- g. Shift of cultivators to non-farm jobs.

CHALLENGES, POLICIES AND STRATEGIES

- 1. Enhancing yield of major commodities
- 2. Integrated nutrient management
- 3. Arresting deceleration in total factor productivity
- 4. Bridging yield gaps
- 5. Water for sustainable food security
- 6. Emphasis on rainfed ecosystem
- 7. Accent on diversification of agriculture and value addition
- 8. Accent on post-harvest management, value addition and cost-effectiveness
- 9. Increased investment in agriculture and infrastructures
- 10. Fighting poverty and hunger
- 11. Accent on empowering the small farmers
- 12. Disaster management
- 13. Keeping pace with globalization
- 14. Exploiting cyberspace

IMPORTANCE OF AGRICULTURE

- 1. Source of livelihood
- 2. Contribution to national income
- 3. Supply of food and fodder
- 4. Importance in international trade
- 5. Marketable surplus
- 6. Source of raw material
- 7. Importance in transport
- 8. Contribution to foreign exchange resources
- 9. Vast employment opportunities
- 10. Overall economic development
- 11. Source of saving
- 12. Source of government income

13. Basis of economic development

PRIORITY AREAS FOR SUPPORT

1. Enhancing agricultural productivity, competitiveness and rural growth
2. Improving water resources and irrigation drainage management
3. Facilitating agriculture diversification to higher-value commodities
4. Developing markets, agricultural credit and public expenditures
5. Poverty alleviation and community actions
6. Sustaining the environment and future agricultural productivity

FINDINGS

1. Agriculture plays an important role in the economic development of the country.
2. Indian agriculture is a diverse and extensive sector involving a large number of actors.
3. It has been one of the remarkable success stories of the post-independence era through the association of Green Revolution technologies.
4. The role of National Agricultural Research System (NARS) was imperative in the context of Green Revolution.
5. Land use is changing in rural areas as farmers are getting good value for their holdings. The effort should be to stop the migration to urban areas.
6. Under the assumption of 3.5% growth in per capita GDP, demand for food grains is projected in the year 2020 at the level of 256mt comprising 112mt of rice, 82mt of wheat, 39mt of coarse grains and 22mt of pulses.
7. The agriculture policy must accelerate all-round development and economic viability of agriculture in comprehensive terms.
8. Farmers must be provided with the necessary support, encouragement and incentives. It must focus both on income and greater on-farm and off-farm job and livelihood opportunities.

9. Literacy had a positive and significant relation with crop productivity and a strong link exists between literacy and farm modernization.
10. Vast untapped potential in the yield exists for all crops in most of the state's accounting for more than three-fourths of crop area. Emphasis must be given to the states in which current yield levels are below the national average yield.

CONCLUSION

Agriculture sector also known as primary sector, is essential for economic growth in any economy including India. It has emerged as an essential-growing sector in the global economy since independence. This sector is contributing 13.7% of GDP. To maintain and accelerate the growth and contributions of this sector and to develop it as a true engine of economic growth, there is a logic and rationale of complementary investments in physical infrastructure as well as in human capital. Agriculture development refers to efforts made to increase farm production in order to meet the growing demand of increasing population. This can be achieved in many ways such as increasing irrigation facilities, increasing cropped areas, the number of crops grown, use of fertilizers etc. Mechanization of agriculture is also another aspect of agricultural development. The ultimate aim of agricultural development is to increase food security. Thus India is trying to fulfill all such requirements to attain growth and development. Government is also taking number of initiatives to develop agriculture status in India.

But survey presents the fact that, food producers of the nation are the poorest. Most of the farmer families are living below poverty line. They are doing such a job of privilege, but they are only suffering from backwardness. Increased attempts must be made to uplift the farmer family; they should be supplied with maximum benefits and facilities, education, infrastructure, and all such facilities which normally other sections of people are enjoying. This would be considered as the respect and support we will be giving to the feeders of our country.

REFERENCES

- Arjun, K. M. (2013). Indian Agriculture – Status, Importance and Role in Indian Economy. International Journal of Agriculture and Food Science Technology, 4 (4), 343-346.
- Borthakur, A. & Singh, P. (2012). Agricultural Research in India: An Exploratory Study. International Journal of Social Science and Interdisciplinary Research, 1 (9), 59-75.
- Himani. (2014). An Analysis of Agriculture Sector in Indian Economy. IQSR Journal of Humanities and Social Sciences, 19(1), 47-54.

A THEORETICAL STUDY ON THE DIGITIZATION OF SUPPLY CHAIN MECHANISMS IN AGRICULTURE IN INDIAN CONTEXT

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ABSTRACT

In the present day context of globalisation, changing information needs of the farmers, increasing pressure of population on the food security system, encouraging the developing economy like India to look for various alternatives in supply chain management and its digitization for its efficient and sustainable agricultural development. India is likely to be considered as the food basket to the world constituting 52% of total land under cultivation as compared to global average of 11%. It is also producing 134.5 MT of fruits and vegetables but due to inadequate cold storage and preservation facilities and improper supply chain infrastructure; there is enormous loss of wastages. Supply chains are principally concerned with the flow of products and information between supply chain member organizations procurement of materials, transformation of materials into finished products, and distribution of those products to end customers. Information Technology has started its dent in certain rural livelihoods especially the farmers in developing countries like India. IT can also do wonders in empowering small and marginal farmers who are operating in a complex, diverse and risk prone environment, which have poor access to information, especially regarding the production systems, customers and markets. In India, the limiting factors for farmers wanting to maximize their farm incomes are poor market linkages, poor access to quality farm-inputs, services and technology, lack of information about Government resources, institutions and extension services. ICT s can connect the producers with buyers to initiate and sustain long term, mutually beneficial and sustainable professional relationships.

Keywords: Supply chain management, ICT, extension services, globalisation, transformation

INTRODUCTION

In the present day context of globalisation, changing information needs of the farmers, increasing pressure of population on the food security system, encouraging the developing economy like India to look for various alternatives in supply chain management and its digitization for its efficient and sustainable agricultural development. Information Technology has started its dent in certain rural livelihoods especially the farmers in developing countries where India has no exception. It can also do wonders in empowering small and marginal farmers who are operating in a complex, diverse and risk prone environment, who have poor access to information, especially regarding the production systems, customers and markets. In India, the limiting factors for farmers wanting to maximize their farm incomes are poor market linkages, poor access to quality farm-inputs, services and technology, lack of information about Government resources, institutions and extension services. Internet is a faster and less expensive ever increasing speed mode of communication frequently used in IT for remote rainforest villages as compared to traditional communication services, such as mail and telephones. E-centres can help to improve social and economic opportunities in isolated areas, facilitate communication between indigenous peoples and organizations, and raise awareness of their concerns to mainstream society. In Asian countries, information technology and telecommunications have assumed an ever-increasing role in the creation of wealth at all levels.

The farmers also lack real time information about consumers, market demand and prices and hence are prone to more exploitation by existing intermediaries in the supply chain. With the growth of organized retailing and free global trade, farming is becoming highly knowledge intensive, commercialized, competitive and globalised, making it necessary to digitize, rebuild competitive and efficient agri-supply chains to benefit both the farmer as well as the consumer. Digitization has a pivotal role to play in market led extension activities. ICTs can connect the producers with buyers to initiate and sustain long term, mutually beneficial and sustainable professional relationships. The existing disconnection between the producers and buyers in terms of harmonization of standards of agricultural produce is the cause for low value realization for the producers. Practically, the same disconnection is also increasing the cost of procurement for the buyers of agricultural commodities. Digitization helps to integrate the production, post-harvest management, value addition and marketing of agricultural produce. The ICT sphere also encompasses the quality aspects, agronomic aspects,

traceability aspects and details of measurement of active ingredients, nutrition values etc. In the marketing and value addition perspective, usage of ICT to digitize the information contributes to increased efficiency and value enhancement of agricultural supply chains. Specially, in the Indian context, where the number of land holdings is small and big in number, reaching the multitudes of small farmers is the key for future food security. In a way the disintermediation in the supply chains can be possible by application of ICTs in adequate levels. The supporting mechanism or social benefits that are aimed to reach farmers can also be effectively implemented with the help of ICTs. In this background an effort has been made to study the digitization of supply chain management for its effectiveness in Indian context.

INDIAN AGRICULTURE

India is likely to be considered as the food basket to the world constituting 52% of total land under cultivation as compared to global average of 11%. It is also producing 134.5 M T of fruits and vegetables but due to inadequate cold storage and preservation facilities and improper supply chain infrastructure, there is enormous loss of wastages. Agriculture and its allied industries sector employs 67% of the country's population. In the post WTO regime, an effective agricultural marketing system through cost effective supply chain management, is the key driver of the sustainable development of agricultural economy. Agriculture has been the backbone of Indian economy since independence and before that, right now with nearly 12 per cent of the world's arable land, India is the world's third-largest producer of food grains, the second- largest producer of fruits and vegetables and the largest producer of milk; it also has the largest number of livestock. Add to that a range of agro- climatic regions and agri-produce, extremely industrious farmers, a country that is fundamentally strong in science and technology and an economy which one of the largest in the world with one of the highest growth rate and you should have the makings of a very good harvest. Yet the comprehensive outlook for Indian agriculture is far more complex than those statistics might suggest. Having just extricated itself from a period of negative growth of -0.1 percent in 2008-2009, to rise to an unspectacular 0.4 per cent in 2009-2010 with upward revision in the production, 'agriculture, forestry and fishing' sector in 2010-11 has shown a growth rate of 6.6 per cent, as against the growth rate of 5.4 per cent in the Advance estimates. Adjusted for inflation, even this 6.6 percent growth looks unexciting when compared to the growth rates in services and manufacturing. Today, agriculture accounts for 13.8 percent of the country's gross domestic product, compared to 51 percent in the 1950s (Government of India, 2011). Worse,

India is amongst the world's largest wasters of food and faces a potential challenge to provide food security to its growing population in light of increasing global food prices and the declining rate of response of crops to added fertilizers. The reforms of 1991 have introduced Indian agriculture to the globalization which has very significant impact on agriculture and supply chain.

SUPPLY CHAIN MANAGEMENT

Supply chains are principally concerned with the flow of products and information between supply chain member organizations - procurement of materials, transformation of materials into finished products, and distribution of those products to end customers. Today's information-driven, integrated supply chains are enabling organizations to reduce inventory and costs, add product value, extend resources, accelerate time to market, and retain customers. The real measure of supply chain success is how well activities coordinate across the supply chain to create value for consumers, while increasing the profitability of every link in the supply chain. In other words, supply chain management is the integrated process of producing value for the end user or ultimate consumer. The supply chains of different agricultural commodities in India, however, are fraught with challenges stemming from the inherent problems of the agriculture sector. The agri supply chain system of the country is determined by different sartorial issues like dominance of small/ marginal farmers, fragmented supply chains, absence of scale economies, low level of processing/value addition, inadequacy of marketing infrastructure etc. The agri supply chains in India and their management are now evolving to respond to the new marketing realities thrown by the wave of globalisation and other internal changes like rise in the level of disposable income of consumers, change in the food basket of the consumers towards high value products like fruits, vegetables and animal protein. The new challenges of the agricultural economy of the country have now spurred the government agencies to go in for different legal reforms for enabling and inviting private investment in agricultural marketing infrastructure, removing different entry barriers to promote coordinated supply chain and traceability.(Sazzad.P 2014).The amended APMR Act, the major agricultural Marketing Act of the country, being implemented by the different states of India, now contains enabling provisions to promote contract farming, direct marketing and setting up of private markets (hitherto banned). These

measures will go a long way towards providing economies of scale to the small firms in establishing direct linkage between farmers, and processors/ exporters/ retailers, etc. Thus,

the measure will provide both backward and forward linkages to evolve integrated supply chains for different agri produce in the country (MANAGE 2013).

Marketing channels for fruits and vegetables in India vary considerably by commodity and state, but they are generally very long and fragmented. The majority of domestic fruit and vegetable production is transacted through wholesale markets although depending on the state and commodity; farmers may sell to traders directly at the farm gate, to traders at village markets, or directly to processors, co-ops and others.

COORDINATED SUPPLY CHAINS

Coordinated supply chains involve structured relationships among producers, traders, processors, and buyers whereby detailed specifications are provided as to what and how much to produce, the time of delivery, quality and safety conditions, and price. These relationships often involve exchanges of information and sometimes assistance with technology and finance. Coordinated supply chains fit well with the logistical requirements of modern food markets, especially those for fresh and processed perishable foods. (Ahya, 2006). These chains can be used for process control of safety and quality and are more effective and efficient than control only at the end of the supply chain. Several companies in India are beginning to invest in integrated supply chain management systems and infrastructure with emphasis on quality and, to a lesser extent, on safety. Different models are emerging including fruit and vegetable retail outlets that directly procure produce from farmers or grower associations through various formal/informal contractual arrangements. Collection-cum-grading centres have been established in rural areas with all produce moving through a central distribution facility having modern infrastructure including cold storage, ripening rooms and controlled atmosphere chambers. Growers are required to follow certain specifications and are often provided with some inputs and technical advice about agronomic and post-harvest practices (MANAGE, 2013).

Contract farming for fruits and vegetables is already being practiced in several states and is likely to expand considerably due to legal reforms initiated in India, i.e., implementation of Model APMC Act. Until recently, contract farming was not legally recognized in most states and a legal framework for governing contracting arrangements was missing. Under the APMC Model Act a new chapter on ‘contract farming’ was added which provides for the registration of contract buyers, the recording of contract farming agreements and time-bound dispute resolution mechanisms. This information has been digitized and kept ready as a blue

print for further reference. It also provides an exemption from the levy of market fees for produce covered by contract farming agreements and provides indemnity to farmers' land to safeguard against the loss of land in the event of a dispute. Contract buyers will now be able to legally purchase commodities through individual purchase contracts or from farmers markets. Provision has also been made in the legislation for direct sale of farm produce to contract buyers from farmer's fields without it being routed through notified markets. This calls for the collective action in supply chains. Initiatives are taken to establish more terminal markets based on modern infrastructure. Terminal markets would endeavour to integrate farm production with buyers by offering multiple choices to farmers for sale of produce such as electronic auctioning and facility for direct sale to exporter, processor and retail chain network under a single roof. In addition, the market would provide storage infrastructure thus offering the choice to trade at a future date to the participants. It is envisaged to offer a one-stop-solution that provides Logistics support including transport services & cool chain support and facility for storage (including warehouse, cold storage, ripening chamber, storage shed), facility for cleaning, grading, sorting, packaging and palletisation of produce and extension support and advisory to farmers.

The model presents integration of agri supply chains for perishables through terminal markets. Presently in the regime of fragmented and inefficient agri supply chains there is no control and command of chain partners on the other following that they are not able to maintain quality of produce in their chain. In order to bring integrated command, source quality produce by way of organizing farmers in groups and providing them the right technical advice and link farmers to the market, modern terminal market complexes will prove a dent. With increasing private investment in the food retail sector and impending changes in contract and marketing laws, shorter and more direct supply chains with traceability are expected to become more common. The incidence and spread of coordinated supply chains will be closely connected with the pace and direction of food retail sector modernization within India. Thus far, changes in food retail have been gradual, and considerably slower than observed in many other developing countries. Supermarket procurement regimes for sourcing of fruits, vegetables, dairy and meat strongly influence the organization of the supply chains. The rising scale of organized retail in the Asian countries (like Metro Cash & Carry, Tata Chemicals and Field Fresh Foods, Bharti Enterprises, Reliance Fresh in India) is now playing a vital role in organizing farmer production bases and integrating these into the retailers' fresh produce supply chain, thus procurement systems in this segment is changing fast responding to the consumer demand and competition.

DIGITIZATION AND ITS IMPLICATIONS

ICT is a powerful tool to integrate the production, post-harvest management, value addition and marketing of agricultural produce. The ICT sphere also encompasses the quality aspects, agronomic aspects, traceability aspects and details of measurement of active ingredients, nutrition values etc. In the marketing and value addition perspective, ICT contributes to increased efficiency and value enhancement of agricultural supply chains. Specially, in the Indian context, where the number of land holdings is small and big in number, reaching the multitudes of small farmers is the key for future food security. In a way the disintermediation in the supply chains can be possible by application of ICTs in adequate levels. These IT applications cannot be limited to marketing aspects alone but are to be integrated with the production aspects for its sustainable development. These aspects are having certain social implications in Indian context. The existing land use patterns, land records, tenancy norms soil health and its enrichment are being digitized and also need to be recorded. Information Technology should be used for maintaining an updated and enriched database of region specific agricultural information and timely dissemination of the information pertaining to seed selection, actions relating to arrival of monsoon, climate control etc. to the farmers. In addition, information regarding agricultural products, demand-supply status in respect of different products and the current price should be made available on-line to the farmers for taking timely decisions on crop product diversification strategies and positioning of the same in right market to get optimum revenue. With agile, demand-driven supply, focusing on reducing end-to-end supply network time by building a flexible and responsive supply network is the need of the hour. (Narula, et al 2010). The educational and professional institutions should take for guiding the latest information using IT as a tool and make it available to the farmers. The need of the day is to harness the vast potential of agriculture in Indian economy.

The ICT sphere also encompasses the quality aspects, agronomic aspects, traceability aspects and details of measurement of active ingredients, nutrition values etc. In the marketing and value addition perspective, ICT contributes to increased efficiency and value enhancement of agricultural supply chains. Specially, in the Indian context, where the number of land holdings is small and big in number, reaching the multitudes of small farmers is the key for future food security. In a way the disintermediation in the supply chains can be possible by application of ICTs in adequate levels. The supporting mechanism or social benefits that are aimed to reach farmers can also be effectively implemented with the help of ICTs. In

conditions of poor information flows supply chains are highly fragmented. Otherwise information technology driven innovations make it easier to acquire, manage, and process information and allow closer integration between adjacent steps in the value chain. There is therefore greater integration of supply chains based on information availability (Kunaka, 2010)

Information on supply chain management is a basic element in any development activity. Once it is digitized Information will be available and accessible to all, be it scientific, technical, economic, social, institutional, administrative, legal, historical or cultural in nature. Agricultural information is useful only if it is available, if the users have access to it, in the appropriate form and language. What do the farmers want? They require information inter alia on supply of inputs, new technologies, early warning systems (drought, pests, diseases), credit, market prices etc. Information, in the field of agriculture, to be of benefit, has to be tailored to local agro-ecological and socio-economic conditions. It has to be backed up by relevant input supply services, and public policies. Synchronization in time and space between knowledge and input delivery systems is essential to impart credibility to the extension message. Agricultural Extension Services do play an important role in delivering information, knowledge and advice to farmers. However to remain relevant in these changing times, it has to specialize in “effectively managing and transferring knowledge or information packages”. Emerging digital technologies can play an important role in supporting extension in this regard. (Meera 2014). Over the past two decades, Governments all around the world have invested heavily in strengthening the national ICT infrastructure.

Need for improved agricultural extension throughout the developing world has never been greater. Agricultural and rural development and hence, rural extension continue to be in transition in the developing world. These transitions are happening because of the forces that are driving the world agriculture today. The vulnerability of farming in the developing world is quite evident due to forces like climate change, changes in natural resources quality, lack of coping strategies at micro and macro levels of decision making, coupled with globalization, emerging market forces like commodity markets, sustainability constraints etc. The challenges can only be met from information intensive efforts in the extension systems (Shaik Meera, N et.al 2010). These information intensive extension efforts can be possible when extension systems embrace digital opportunities available with us today.

E-CHOUPAL EXPERIENCE OF ITC

ITC Ltd implemented a project on electronic market place for the soybean farmers in the state of Madhya Pradesh. The project owes its success to the factors such as utilization of local leadership in the villages, a sustainable business model and collaboration between the local authorities and the corporate implementer. The technology embarked was easy to replicate and easily scalable, and it was customized according to the needs of the local farmers. The project has helped the farmers developing sustainable income levels, elimination of the middlemen, developing easy access to the market place and shared ownership of the project.



ITC Initiative of Demonstration for farmers

E-GOVERNANCE IN FISHERIES

The Fisher Friend Mobile Application (FFMA) is a unique, single window solution for the holistic shore-to-shore needs of the fishing community, providing vulnerable fishermen immediate access to critical, near real-time knowledge and information services on weather, potential fishing zones, ocean state forecasts, and market related information. The application is an efficient and effective decision support tool for the fisher community to make informed decisions about their own personal safety and the safety of their boats, as well as make smart choices for fishing and marketing their catch. FFMA is developed on an android platform in partnership with Wireless Reach Qualcomm and Tata Consultancy Services and is currently available in English, Tamil, and Telugu



Figure to show the fisher friend mobile app

ICT PLATFORM OF EID PARRY

East India Distilleries (EID) Parry has implemented the project “Parry’s Corner” to help the farmers, provide them with value-added services, and improve their income levels and the productivity of their farms. The self-help groups in the vicinity are using the ICT platform for e-commerce. This has helped in the creation of social networks. Social networks facilitate the diffusion of ICT platforms. The major reason for the success of this project has been that the company has been in operation in that region for a long time. The high levels of trust existing between the company executives and farmers helped in the rapid diffusion of the utilization of the ICT platform for a variety of reasons. The technology selected was a low cost option and hence the overheads were not high for platform. As FAO (2005) notes, the information system obviously remove critical barriers that have kept farmers from participating in the commercial supply chain. Farmers receive relevant and timely information regarding crop production, the company effectively communicates demand and quality requirements, and farmers can demand a fair price and be assured of a market. Further, agricultural yields, access to finance, agricultural extension services, and time required to transact with EID Parry all have reportedly improved. These improvements have not been quantified, however (FAO, 2005).

FARMER'S PORTAL OF GOVERNMENT OF INDIA

The Farmers' Portal of the Department of Agriculture & Cooperation is a platform for farmers to seek any information related to agriculture (Figure 3). Detailed information on farmers' insurance, agricultural storage, crops, extension activities, seeds, pesticides, farm machineries, etc. is provided. Details of fertilizers, market prices, package and practices, programmes, welfare schemes are also given. Block level details related to soil fertility, storage, insurance; training, etc. are available in an interactive map. Users can also download farm friendly handbook, scheme guidelines, etc.



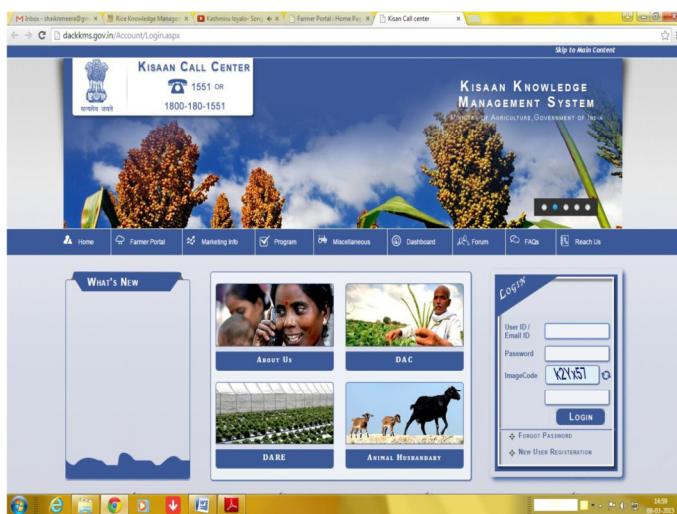
Above image showing farmer's portal of the department of agriculture and co-operation

KISAN CALL CENTRE SERVICES

Kisan Call Centres (KCCs) was launched by the Ministry of Agriculture took to harness the potential of ICT in agriculture. This initiative was aimed at answering farmer's queries on a telephone call in their own language / dialect. IFFCO Kisan Sanchar Limited (IKSL) was selected by the Department of Agriculture and Cooperation (DAC), Ministry of Agriculture (MoA), Government of India, to manage the KCC services. The services were re-launched on 1st May 2014 by IKSL. In this endeavour, IKSL had completely revamped the services and set up state of the art ICT infrastructure.



Above image showing a Kisan call centre



Above image showing the knowledge management system

M-KISAN PROJECT OF GOVERNMENT OF INDIA:

The project conceptualized; designed and developed in-house within the Department of Agriculture & Cooperation USSD has widened the outreach of scientists, experts and Government officers posted down to the Block level to disseminate information, give advisories and to provide advisories to farmers through their mobile telephones. Since its inception nearly 72 crore messages or more than 210 crore SMSs have been sent to farmers throughout the length and breadth of the country. These figures are rising ever since. These messages are specific to farmers' specific needs & relevance at a particular point of time and generate heavy inflow of calls in the Kisan Call Centres where people call up to get supplementary information. SMS Portal for Farmers has empowered all Central and State

Government Organizations in Agriculture & Allied sectors (including State Agriculture Universities, KrishiVigyanKendras, Agromet Forecasts Units of India Meteorological Department, ICAR Institutes, Organization in Animal Husbandry, Dairying & Fisheries etc.) to give information/services/advisories to farmers by SMS in their language, preference of agricultural practices and locations. USSD (Unstructured Supplementary Service Data), IVRS (Interactive Voice Response System) and Pull SMS are value added services which have enabled farmers and other stakeholders not only to receive broadcast messages but also to get web based services on their mobile without having internet.

LIMITATIONS

As the Supply Chain involves a number of players, the extent of integration of services depends on the degree of trust and information sharing amongst the players. It is often observed that the big players in their efforts to make vertical/horizontal integration of different activities end up gobbling up the weak ones. What in fact is called for is strengthening of the system and process, so that requisite synergies evolve to give benefits to all the partners.

The ultimate choice of the ICT enabled agriculture approach depends on (1) the ICT policy environment, (2) the capacity of ICT service providers, (3) the type of stakeholders and the ICT approach adopted, and (4) the nature of the local communities, including their ability to access and apply the knowledge and various e-readiness parameters.

The level of integration of digital media into the governance process in agriculture will determine the fate of Indian agriculture in years to come.

In order to shore up the emergence of professionally managed agri-supply management of different agricultural produce, the Government should play its facilitating role. Some of the major issues that need to be focused in the public domain are:

- Focus should be laid on free play of demand and supply forces in the market. This has to be enabled by removing different entry barriers, having a proper market information system, promoting grading and standardization, taking care of quality and safety issues, putting up a strong system of risk management and price formation mechanism. This can be done only by digitizing the information available at various levels of supply chain.
- Different legal restrictions inhibiting growth of competitive environment should be dismantled and replaced by a facilitating legal environment.

- Infrastructure is the major constraint in Indian marketing system. Since it is difficult to arrange sufficient funds from the public exchequer for the development of infrastructure facilities, the need of the hour is to explore different Public Private Partnership models.
- The extension mechanism of the country is production oriented relegating the marketing aspects to the backburners. It is time for the Stakeholders to provide basic information in supply chain in a digitized form.
Within broad framework of a conducive environment provided by Government side, the private sector should come up in a pro-active manner to invest in agriculture sector. In no way, they should be discouraged by the teething troubles as entrepreneurs in this virgin sector in India. The managerial efficiencies brought about by the private sector to the agricultural economy of the country will go a long way towards ensuring optimum utilisation of resources, thereby ensuring sustainable growth for the sector.

CONCLUSION

Usefulness of ICT in the form of digitizing the all possible information is well established in improving productivity of Agricultural sector and these needs to be addressed by authorities. Food loss reduction is less costly than an equivalent increase in food production. If efforts are not made to modernize the harvest handling system for horticultural crops, then postharvest losses will continue to have a negative economic and environmental impact. There is no doubt that postharvest food loss reduction significantly increases food availability. An efficient collaboration between stakeholders will reduce risk, losses and greatly improve the efficiency to ensure food security and development. The important link between the whole chain of digital networks and their applications is the ultimate beneficiaries of these initiatives those are the stakeholders. It is common to find that intended users (farmers) are either unaware of the ICT services / or do not perceive these services as applicable in their field conditions. Unfortunately the task of understanding the clientele and their information need has been subsided by the technological enthusiasm that is prevailing in Indian context. (Shalendra 2013)

Agricultural extension, whether public or private, operates in a context that influences the organization, form, and content of transfer activities. For instance, what necessitates

current extension / advisory organisations to integrate digitization into their functional / structural components? The history and recent developments in Asia illustrate that ICT "prescriptions" are doomed to fail if they are not based on 'farmers needs'. And it must be driven by learning about what works and what does not and by the nature of local circumstances and context. We need to address relevant issues such as what makes public extension workers to become info-mediatory. Their job chart needs to be transformed radically with a scope for incentives for efficient performance using digital tools. ICT applications alone will not be readily available, accessible and applicable in farmers' conditions. It requires higher commitments from all the agricultural professionals. Further we need to build farmers communities on large scale government should plan campaigns for 'zooming in zooming out' farmers learning/ experiences using ICTs.

However the idea of Digitization of supply chain, essentially provides linkages, enhance market access, improve business process, increase product diversity and reduce development cycle time in Indian agriculture. Understanding ICT context for Indian agriculture will help developing nation level strategies. Digital India's perspective of agriculture will have a real challenge in integrating 'knowledge' with 'time critical services' in the whole chain of agricultural value chain. We should have evidences of use, pattern, purpose, users etc., for ICT activities. These IT applications cannot be limited to marketing aspects alone but are to be integrated with the production aspects for its sustainable development. These aspects are having certain social implications in Indian context. The existing land use patterns, land records, tenancy norms soil health and its enrichment are being digitized and also need to be recorded. Information technology should be used for maintaining an updated and enriched database of region specific agricultural information and timely dissemination of the information pertaining to seed selection, actions relating to arrival of monsoon, climate control etc. to the farmers. In addition, information regarding agricultural products, demand-supply status in respect of different products and the current price should be made available on-line to the farmers for taking timely decisions on crop product diversification strategies and positioning of the same in right market to get optimum revenue. With agile, demand-driven supply, focusing on reducing end-to-end supply network time by building a flexible and responsive supply network is the need of the hour. The educational and professional institutions should take for guiding the latest information using IT as a tool and make it available to the farmers. The need of the day is to harness the vast potential of agriculture in Indian economy.

REFERENCES

1. Ahya, C 2006 ‘The Retail Supply Chain Revolution’. The Economic Times, Retrieved on 29.03.2013 from http://articles.economictimes.indiatimes.com/2006-12-07/news/27452233_1_retail-revolution-retail-sector-supply-chain.
2. FAO (Food and Agriculture Organization) 2005, ‘Case Study: Community Based Information Systems’, India. Government of India 2011, Economic Survey report, Ministry of Finance.
3. <http://www.manage.gov.in/studymaterial/scm/E.pdf> .Reading material on Supply chain management in agriculture. ICT applications for Agribusiness supply chains.
4. <http://www.ictinagriculture.org/sourcebook/module-10-ict-applications-agribusiness-supply-chains>.
5. Kunaka, C 2011, ‘Logistics in Lagging Regions: Overcoming Local Barriers to Global Connectivity’, Washington DC, World Bank. MANAGE, 2013, Reading material on supply chain management, Rajendranagar, Hyderabad, India.
6. Sapna, A, Narula, Navin Nainwal, 2010, ICT and agriculture supply chains, opportunities and strategies for successful implementation. Information technology in developing countries. A newsletter of the IFIP working group. 9.4 vol. 20, no.1. www.iimahd.ernet.in/e_gov/ifip/feb2010/sapna.narula.htm.
7. Sazzad, P 2014, ‘Food supply chain management in Indian Agriculture: Issues, opportunities and further research’. African journal of management, vol. 8, no.14, pp. 572-581. doi. 10.5897/ajbm2013.7292
8. Shaik Meera, N 2014, ‘Digital India & Agricultural Sector - Can we make it Digital Bharat?’ Concept paper, DRR, Rajendranagar, Hyderabad.

9. Shaik Meera, N, Arunkumar, S, Amtul Waris, Vara Prasad, C, Muthuraman, P, Mangalsen, and Vikranth, BC 2010, ‘E-Learning in extension systems- Empirical study in Agricultural Extension in India’. Indian Journal of Extension Education, vol. 46, no. 3&4, pp. 94-101.
10. Shalendra and Purushottam, 2013, ‘User centric ICT model for supply chain of horticulture crops in India’. Agricultural Economics Research Review, vol. 26, no. 1, pp. 91-100.

CHALLENGES AND OPPORTUNITIES OF PRECISION AGRICULTURE IN A FLAT WORLD

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ABSTRACT

Precision Agriculture is generally defined as information and technology based farm management system to identify, analyze and manage variability within fields for optimum profitability, sustainability and protection of the land resource. In this mode of farming, new information technologies can be used to make better decisions about many aspects of crop production. Precision agriculture highlights the increased efficiency that can be realized by understanding and dealing with the natural variability found within a field. The goal is not to obtain the same yield everywhere, but rather to manage and distribute inputs on a site specific basis to maximize long term cost/benefit input costs and decreasing commodity prices, the farmers are looking for new ways to increase efficiency and cut costs. Precision farming technology would be a viable alternative to improve profitability and productivity. Precision Agriculture has witnessed unprecedented growth in the last decade, especially in countries such as the United States, Germany and others. This paper will present the broad concept of precision agriculture with several examples of precision nutrient management from several countries. There, farmers and practitioners have overcome the challenges associated with precision nutrition management and converted them into opportunities by harnessing the global information and developing local precision techniques suitable for their region, operation and resources. With increasing global population and limited or decreasing arable land available for crop production the question arises “will we be able to overcome the future challenges and seize them as opportunities?” Precision agriculture management coupled with genetic improvements in crop traits will play a crucial role in meeting global demand for food, feed, fiber and fuel in the near and distant future.

Keywords:

Precision agriculture, productivity, harnessing technology, sustainability, efficiency, optimum profitability, unprecedeted growth

INTRODUCTION

When we think of agriculture we think of cultivation, plant life, soil fertility, types of crops, terrestrial environment, etc. But in today's world we associate with agriculture terms like climate change, irrigation facilities, technological advancements, synthetic seeds, advanced machinery etc. In short we are interested in how science of today can help us in the field of agriculture. And so comes into the picture Precision Agriculture. The general definition is information and technology based farm management system to identify, analyze and manage spatial and temporal variability within fields for optimum productivity and profitability, sustainability and protection of the land resource by minimizing the production costs. Simply put, precision farming is an approach where inputs are utilized in precise amounts to get increased average yields compared to traditional cultivation techniques. Hence it is a comprehensive system designed to optimize production with minimal adverse impact on our terrestrial system. The three major components of precision agriculture are information, technology and management. Precision farming is information-intense. Precision Agriculture is a management strategy that uses information technologies to collect valuable data from multiple sources which factors into the decision-making process. It relies on technologies like GPS (Global Positioning Systems), GIS (Geographic Information Systems), yield monitors, remote mapping sensors and guidance systems for application with variable rate which enables in-depth monitoring of field variations.

The advent of precision agriculture that occurred in the developed world about two decades ago involved application of advanced and innovative technologies. Precision agriculture in developed countries continued in that direction and today it is more sophisticated and complex than before. Interestingly, there are a number of definitions and concepts that can be found in literature pertaining to precision agriculture. The one that is most commonly cited and used by practitioners is the one that consist of several “R”s of Precision Agriculture. Robert et al. (1994) proposed three “R”s, the Right time, the Right amount and the Right place. Later, the International Plant Nutrition Institute added another “R” to that list, “the Right Source”, and more recently, Khosla (2008) proposed an additional “R”, the Right manner. For example, in precision nutrient management, “Right manner”, refers to the

method of placement of nutrient in the soil, (i.e.) broadcast versus banding, dribbling, injecting, etc. The “right manner” aspect may be not be very important for agriculture practiced in the developed world, however, it is of great importance for global precision agricultural practices.

NEED FOR PRECISION AGRICULTURE

The potential of precision farming for economical and environmental benefits could be visualized through reduced use of water, fertilizers, herbicides and pesticides besides the farm equipments. Instead of managing an entire field based upon some hypothetical average condition, which may not exist anywhere in the field, a precision farming approach recognizes site-specific differences within fields and adjusts management actions accordingly (Figure 2b). Farmers usually are aware that their fields have variable yields across the landscape. These variations can be traced to management practices, soil properties and/or environmental characteristics. A farmer’s mental information database about how to treat different areas in a field required years of observation and implementation through trial-and error. Today, that level of knowledge of field conditions is difficult to maintain because of the larger farm sizes and changes in areas farmed due to annual shifts in leasing arrangements. Precision agriculture offers the potential to automate and simplify the collection and analysis of information. It allows management decisions to be made and quickly to be implemented on small areas within larger fields.

The concept of “R”’s does not mandate utilization of advanced technologies to practice precision agriculture. For example, it may take a suite of auto-pilots or high resolution guidance system on a 1000 hectare farm in the USA or Brazil to practice precision agriculture or it may take a group of skilled labors/farmers to practice precision planting on a 0.5 hectare field in a small farm in India or Asia. While the scale of farming is certainly contrasting in the two scenarios, both scenarios involved and implemented the “five R”’s to identify and manage spatial and temporal variability, and hence would fall under precision agricultural practices.

Much of the recent research particularly in precision nutrient management has focused on the spatial and temporal aspects (i.e., right place and right time). Agricultural industry has been proactive in providing the innovative tools to realize the spatial and temporal management aspects of precision nutrient management. There is no doubt that significant progress has been made in managing nutrients more precisely across crop fields. However, there are still a number of challenges associated with precision nutrition management. For the ease of

understanding, these are categorized on the basis of the four “R’s used in precision agriculture.

THE RIGHT SOURCE

The right source of nutrient is not of grave concern since that has been identified and established for a long time. However, in the dynamic world of precision nutrient management, where the machine based decision is made in “real-time” it becomes imperative that we must realize the limiting nutrient(s) and adequately address the need with the correct source. For example, it is currently not feasible to differentiate the nutrient deficiency of iron versus nitrogen in maize (*Zea Mays. L*) Crop field using sensing technology. Unfortunately, most or all of the precision nutrient management research has focused on the macro nutrients (the nitrogen, Phosphorus and Potassium). It is often assumed that other nutritional needs of the crop are met by uniform application. We need a suite of sensors that could identify the unique reflectance signature for various nutrient deficiencies in crop species.

THE RIGHT PLACE

Since inception of precision agriculture “the right place” aspect has received the most attention by scientists and practitioners. There are a number of sampling techniques and designs that allow us to characterize and quantify the scale and pattern of spatial variability in fields, such as grid soil sampling, site-specific management zones, smart sampling, soil electrical conductivity measurements, etc. However, we still need an economically feasible technique of quantifying the spatial variability in soil and crop properties at a scale that exists in the heterogeneous fields.

THE RIGHT TIME

Availability of ‘active remote-sensors’ that can be mounted on high clearance fertilizer applicators has coupled the technology of “mapping variability in the crop canopy” and “variably applying fertilizer” simultaneously in “real-time”. While the active sensors have been around for about 5 years, their adoption has been slow to come. The 14th annual survey of precision agricultural activities in the USA, indicate that the active sensor based fertilizer application ranks at the bottom of the list (Whipker and Akridge 2009). This could be attributed partially to the timing at which the commercially available active sensors can accurately quantify the variability in crop canopy. For example, research in Colorado, USA,

has shown that active sensors can accurately assess the spatial variability in crop nitrogen (N) needs at the maize growth stage of

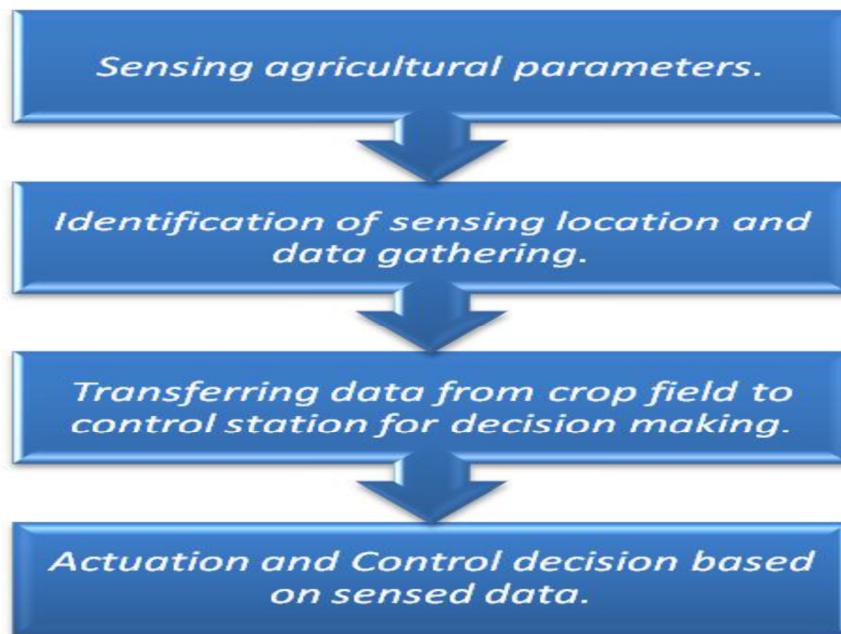
V12 (Ritchie, et al. 1992). Unfortunately, the majority or all the farmers in Colorado complete their N application for the growing season prior to that growth stage. Primarily because farmers are wary of potential delays in getting into the field due to rain, etc., which make them very hesitant in delaying in-season sidedress fertilizer applications. It will take a paradigm shift in changing the thought process of the farmers for them to adopt active-sensing based precision nutrient management or alternatively we need better sensing technology that could sense crop canopy early in the season to provide an estimation of crop nutrition needs, such that it coincide with farmer's "time" of applying nutrients (N) to the crop.

THE RIGHT AMOUNT

After the advent of precision technologies, the right amount of nutrient to be applied across spatially variable fields was initially accomplished by utilizing existing nutrient recommendation algorithms developed by the research and academic institutions / Universities. However, it was soon realized that the traditional algorithm lack the robustness needed for the site-specific aspect of precision nutrient management. The new recommendation algorithms that are being developed are non-regional in approach and in some cases are unique to the site. This has created a new challenge to develop a database of multi-year field observations to create a reliable algorithm for precision nutrient recommendations that is accurate on a broader region. There is an opportunity for a technological innovation that would allow estimation of nutrient balance for each field that would aid in nutrient management and environmental sustainability. Irrespective of the challenges associated with Precision Agriculture and precision nutrient management in particular, the trajectory of precision agriculture, as witnessed over the past 20 years, is indeed correct. We will soon be venturing into the Precision Agriculture, version 2.0, in the future to meet the growing demand for food, feed, fiber, and fuel of the world.



Above figure showing Precision agriculture: A Comprehensive approach



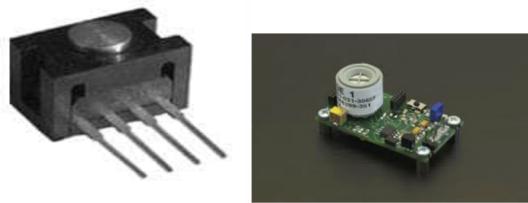
Above image showing basic steps involved in Precision agriculture

THE FLAT WORLD

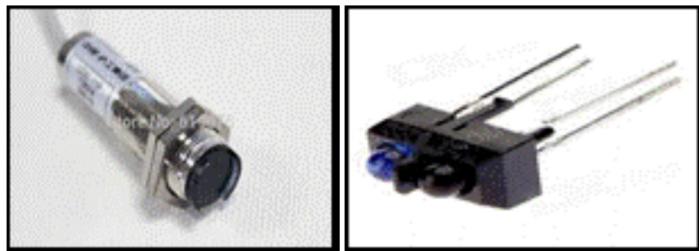
We are increasingly living in the “Flat World”. If we were to expand our horizon across the globe, we will witness that it is indeed a flat world. In today’s environment, an increase in fertilizer demand in Asia, impacts the local fertilizer prices in the USA. Likewise, a bumper

crop produced in South America influences the commodity prices in Asia or Europe; or food scarcity in Haiti or Indonesia becomes a cause of concern for everyone. In a growing flat world, we are no longer insulated from external factors. There are clear signs that the global population and demand for high quality food is increasing. On the contrary, our arable land resource is decreasing and is competing with other factors such as population, bio-energy crops, and urbanization. What role precision agriculture would play to meet the increasing demand for food, feed, fiber, and fuel requirement of the world?

Precision agriculture is often misinterpreted by the developing world as complex technological intervention to agriculture, which is meant for large crop fields in the developed world. Precision agriculture and nutrient management however, can and will play an important role in lesser developed parts of the world. In a recent article in Economic Times (Dec 2009) by Dr. William Dar, Director General of ICRISAT (International Crop Research Institute for Semi-Arid Tropics), asserted that “ICRISAT staff was able to increase grain yields of nutrient starved soils in Africa by carefully micro-doing the nutrients to the crops”. This is an excellent example of precision nutrient management on small scale farms without large technological inputs. Likewise, Dobermann and Cassman (1996) fifteen years ago, proclaimed that precision nutrient management in the Rice-Wheat Cropping Systems in Asia, would provide another on-farm revolution. Wong et al. 2004 presented several case studies highlighting the methods in which farmers choose to improve their management of in-field variability. They concluded that precision agricultural research needs to focus on improving outcomes and not necessarily the tools, to cater best for the needs of the farmers. Precision agriculture has the potential to contribute to increased production in diverse agricultural environments and conditions across the globe. Will we be able to overcome the future challenges and seize them as opportunities? Precision agriculture management coupled with genetic improvements in crop traits will play a crucial role in meeting global demand for food, feed, fiber and fuel in the near and distant future.



Above images showing mechanical sensors for soil analysis



Above image showing optical sensors used for scanning crops

Constraints in Adoption of Precision Farming:

Some of the key challenges that need to be considered while taking PA to the Indian market are briefly shared below, quoting from Tata's case study:

- Conceptualizing ICT platforms have to be done after consulting the users. Agricultural practices are crop specific and region specific. ICT platforms have to be specifically customized for user needs
- Development of ICT platforms have to be done in a phased manner so that the project grows in an evolutionary manner. Starting the project in a pilot phase and then validating and expanding it, is the best way for making sure that a project concept works in real life
- The crucial aspect of ICT in rural areas is that the contact person should develop a working relationship and trust at the grass root level
- Designing ICT platforms for agricultural systems have to be done very systematically. Relationships have to be developed with the users and platform holders
- BIS Research estimates the global market size for precision agriculture to grow over \$6.34 billion by 2022 at an estimated CAGR of 13.09% from 2015 to 2022. The trends suggest that with U.S. at the forefront, North America will continue with its dominance during the forecast years. Also, with the world's most populous countries China and India, APAC will emerge as the fastest growing region in the market at a CAGR of 18.29% from 2015 to 2022

In conclusion, Indian market is quite ready for introducing PA and the time is ripe with the government releasing a farmer-friendly budget for 2015. The only caution would be to select progressive states in which adoption of PA is easy to start with. The way forward is to develop cost-effective solutions keeping in mind the challenges an Indian farmer faces in the real world. Soil management, productivity challenges and optimizing inputs are just a few challenges that can make a difference to the science of food production in one of the oldest democracies of the world.

CONCLUSION

There are opportunities for adoption of precision agricultural techniques around the globe. The form of precision practices may be different from one place to another place, depending upon the creative mindset of farmers, practitioners, scientists and consultants local to the area of interest. This paper highlights the broad concept of precision agriculture with several examples of precision nutrient management practices from several countries where farmers and practitioners have overcome the challenges and converted them into opportunities by harnessing the global information and developing local precision techniques suitable for their region, operation and resources. Lack of information, connectivity problems faced in remote areas and lack of financial support are hurdles in the path of Precision Agriculture. Successful adoption of PA comprises of three phases including exploration, analysis and execution. While exploration and analysis are way ahead execution is steadily catching-up. Precision agriculture addresses both economic and environmental issues that surround agriculture production today. Coordination between farmers and both the MNC's and the government are gaining momentum. However, concerns about cost-effectiveness and the most effective ways to use the technological tools we now possess, still remains a work-in-progress. In the light of tomorrow's expected need and today's urgent requirement, PA needs to become the only choice and not a choice in the field of agriculture.

REFERENCES

- Singh AK (2004) Precision Farming. Water Technology Centre, I.A.R.I., New Delhi.
- Shanwad UK, Patil VC, Honne Gowda H (2004) Precision Farming: Dreams and Realities for Indian Agriculture. KSR SAC, Bangalore.
- USC Precision Agriculture.

- Gomide RL, Inamasu RY, Queiroz DM, Mantovani C, Santos WF (2001) An automatic data acquisition and control mobile laboratory network for crop production systems data management and spatial variability studies in the Brazilian center-west region. ASAE Paper No.: 01-1046.
- Cugati S, Miller W, Schueller J (2003) Automation concepts for the variable rate fertilizer applicator for tree farming. Proceedings of the 4th European Conference in Precision Agriculture, Berlin, Germany.
- Jensen AL, Boll PS, Thysen I, Pathak BK (2000) Pl@nteInfo: a web-based system for personalized decision support in crop management. Comput. Elect. Agric. 25: 271–293.
- Ahmed El-Rabbany GPS for Precision Farming, The Global Positioning System, Second Edition
- Prabawa, Sigit. 2006. Precision farming approach in N,P, and K fertilizing on sugarcane cultivation: case study at PT. Gula Putih Mataram. (In Indonesian, with English abstract.) Ph.D. diss., IPB, Bogor.
- Ritchie SW, Hanway JJ, Benson GO (1992) how a corn plant develops. Iowa State University, Cooperative Extension Service, Ames, IA.
- Dobermann A, Cassman KG (1996) Precision Nutrient Management in Intensive Irrigated Rice Systems – The Need for Another On-Farm Revolution Better Crops and Plant Food **10**(2), 20-25.
- Khosla R (2008) The 9th International Conference on Precision Agriculture opening ceremony presentation. July 20-23rd, 2008.
- Robert P, Rust R, Larson W (1994) Site-specific Management for Agricultural Systems, Proceedings of the 2nd International Conference on Precision Agriculture, 1994, Madison, WI. ASA/CSSA/SSSA.
- Whipker LD, Akridge JT (2009) The 2009 Precision Agricultural Services: Dealership survey results. Developed by the Center for Food and Agricultural Business, Purdue University.
- www.agecon.purdue.edu/cab
- Wong TFM, Stone PJ, Lyle G, Wittwer K (2004) PA for all - is it the Journey, Destination or Mode of Transport that's Most Important? In the CD-ROM proceedings of the 7th International Conference on Precision Agriculture, St. Paul., MN, USA.

- Market Source: ASD reports (<http://www.hortibiz.com/hortibiz/nieuws/precision-farming-to-become-a-634bn-industry/>)
- Dharmapuri study source: Ideas (<https://ideas.repec.org/a/ags/aerrae/47892.html>)
- Source of Tata case study:
http://planningcommission.nic.in/reports/sereport/ser/stdy_ict/12_tatakisan.pdf
- Market data: <http://www.marketsandmarkets.com/Market-Reports/precision-farming-market-1243.html>
- Source for Challenges: <http://www.hortibiz.com/hortibiz/nieuws/precision-farming-to-become-a-634bn-industry/>
- More reading on PA:
- <http://www.nortonrosefulbright.com/knowledge/publications/120848/precision-agriculture-on-the-global-stage>
- http://www.navipedia.net/index.php/Precision_Agriculture



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