

THE NEED OF MARKET ORIENTATION AND THE BEST MANAGEMENT PRACTICES IN INDIAN FARMING

Mr. Parvez Alam Khan, Research Scholar, Presidency College, Hebbal, Bengaluru
Dr. Irshad Nazeer, Associate Professor, Dept. of Management, Presidency College, Kempapura, Hebbal, Bengaluru

Abstract

Unless a business unit is not market oriented and best management practices are being implemented, the business cannot be successful and profitable. Being market oriented means making the product as per the expectations of the customers or buyers, in other words business unit manager has to make a detailed study on demanded products and services which he could make and of course cost analysis and the probable market price when the product is made and kept ready for sale so that he will be able to forecast his profit. Similarly farmer also, whether he owns land or not, need to know his environment, choice of demanded crops suitable to the soil of the land and cost of farm inputs and their availability and market prices of farm produce and also data on weather forecast etc on one hand and best management practices to make his agri-business a profitable venture. This paper reviews on the status of the Indian agriculture (farm) sector, explores root causes of its failure and then discusses the need of market orientation and best management practices to transform agriculture into a successful farm businesses.

Keywords: Market Orientation, Best Management Practices, Innovation, Value Addition, Farm Business.

Introduction

According to the Father of Nation, Mahatma Gandhi "India lives in villages" implying that farmer is the backbone of the nation. To develop a nation the policy makers will first focus on agriculture for this sector serves raw material for various industries and hence industrial development also happens. Hence agriculture is called the primary sector. Soon after the independence our policy makers did focus on agriculture and followed by industry. First two 5 year plans had yielded significant growth from agriculture and industrial sectors. Subsequently there were hiccups in plans as well as their execution and expected growth was not visualized in the economy. We are 2nd in population size; possess 2.3 per cent of world geographical area and 4.2 per cent of world's water resources but lagging behind in the growth of agriculture sector in terms of productivity, profitability, farm management practices, professionalization of agriculture, adoption of latest technology and farming techniques and so on, and finally leading to suicidal of the loser-farmers. These conditions instigated us to probe into the matter with an intention of developing a comprehensive strategy to make agriculture into a profitable venture.

Objectives of the Research

The following are the objectives of the research paper:

1. To study and understand the present status of Indian agriculture
2. To explore the root causes of the unprofitable Indian agriculture
3. To review the literature on the profitable agriculture or farm management practices

4. To develop strategy scheme (best management practices) to make Indian agriculture a profitable one

Present Status of Indian Agriculture

The present status of Indian agriculture is detailed as follows:

a) The state of Indian agriculture with respect to forest area and its percentage in total area, agricultural land, its percentage, and arable land as percentage of total area, rural population in percentage, crop, food and live stock production indices, value addition in GDP, employment in agriculture as percentage of total employment, agriculture value addition in billion dollars, cereal yield and fertilizer usage is presented from 2010 to 2016 in **Table 1**.

It is observed that forest area, agricultural land area and arable land is constant and arable land in percentage a little less than agricultural land. Further rural population is a major chunk of the population ranging from 69% in 2010 to 67% in 2016. There has been a small increase in crop, food and live stock production.

With respect to value added in GDP in percentage is ranging between 17.52% to 16.17% between 2010 and 2016, but in terms of billion dollars, there is good increase due to price increase and inflationary tendency. Agricultural employment of the total employment varies from 51% to 43% implying that agricultural sector holds a lion's share which is not a good indication. Cereal yield per hectare is not encouraging and fertilizer usage is fluctuating.

Table 1 : State of Indian Agriculture

Year	Forest Area in Lakh Sq Km	Forest Area as % of total area	Ag Land in Lakh Sq Km	% of Ag Land	Arable Land as % of total area	Rural Population as % of Total population	Crop Production Index 2004-2006 basis	Food Production Index 2004-2006 basis	Livestock Production index 2004-2006 basis	Value added in Ag as % of GDP	Ag Value added in Bn \$	Emp in Ag % of Total employment	Cereal Yield in 000Kg per hectare	Fertilizer use Kg per hectare of arable land
2010	6.98	23.5	17.95	60.4	52.8	69.07	124.9	123.2	123.5	17.52	290.2	51.51	2.68	179
2011	6.99	23.5	17.97	60.43	52.8	68.72	134.1	130.9	128.2	17.19	313.42	48.8	2.86	180.7
2012	7.01	23.6	17.96	60.42	52.7	68.37	136.2	133.8	131.9	16.85	307.87	47	2.96	163.1
2013	7.03	23.7	17.97	60.44	52.6	68	141.7	139.1	136.3	17.15	318.4	46.6	2.96	156.5
2014	7.05	23.7	17.97	60.45	52.6	67.62	144.4	142.9	143.1	16.79	342.41	45.52	2.96	163.5
2015	7.07	23.8	17.97	60.45	52.6	67.22	139.6	141	149.7	16.17	339.91	44.36	2.86	171
2016	7.09	23.8	17.97	60.45	52.6	66.82	142.8	144.4	152.7	16.28	370.35	43.44	2.99	165.8

Source: Authors Compiled from The Global Economy.com, The World Bank Reports

b) Indian agriculture growth rate during plan periods is observed to be lower than the GDP growth rate and depicted in the following **Table 2**.

Table 2 : Indian Agricultural Growth Rate During Different Plan Periods

5 Year Plans	GDP Overall	GDP Agriculture
8th 5 year plan	6.5	4.8
9th 5 year plan	5.7	2.5
10th 5 year plan	7.6	2.4
11th 5 year plan	8	4.1

Source: Central Statistics Office (CSO)

Further it can strongly be felt that agriculture sector is totally neglected and hence the growth rate of this sector is just half of the GDP growth rate during the 11th 5-year plan.

c) Indian Sector-wise Share in GDP is presented in **Table 3**.

Table 3 : Indian Sector-Wise Share in GDP at Constant (2004-05) Prices

Year	Agriculture	Industry	Services
2004-05	19	27.9	53.1
2005-06	18.3	28	53.7
2006-07	17.4	28.6	54
2007-08	16.8	28.8	54.4
2008-09	15.8	28.1	56.1
2009-10	14.6	28.3	57.1
2010-11	14.6	27.9	57.5
2011-12	14.4	28.2	57.4
2012-13	13.9	27.3	58.8
2013-14	13.9	26.2	59.9

Source: Central Statistics Office (CSO)

It is observed that the contribution of agriculture has continuously been declining; contribution from industry has been fluctuating between 26 and 29 and where as the contribution from services sector has continuously been raising. This implies that after 70 years of independence we are not sufficiently developed in our primary sector which is the base for all other subsequent stages in the economic development. There is an urgent need for government, NGOs, private sector and other agencies to look upon the development of farm sector.

d) Share of agriculture in Gross Value Addition (GVA) is provided in **Table 4**.

Table 4 : Share of Different Sectors in GVA at Constant 2011-12 Prices

Year	Agriculture	Industry	Services
2011-12	18.4	33.1	48.5
2012-13	17.7	32.3	50
2013-14	17.2	31.7	51.1
2014-15	16.1	31.4	52.5

Source: Central Statistics Office (CSO)

As per the **Table 4** it disclosed that the share agriculture in GVA is just 16.1 during 2014-15 and has been declining from 2011-12. Similar is the case with industrial sector as its growth dependent on the growth of primary sector.

e) Rate of Growth of GVA in Different Sectors is displayed in **Table 5**. It is found that there is wide fluctuation in the growth rate of GVA signifying lack of professional approach and effective market oriented direction in the sector.

Table 5: Rate of Growth of GVA in Different Sectors at Constant 2011-12 Prices

Sector	2012-13	2013-14	2014-15
Agriculture	1.2	3.7	0.2
Industry	2.4	4.5	6.1
Services	8	9.1	10.2
Total GVA	4.9	6.6	7.2
<i>Source: Central Statistics Office (CSO)</i>			

f) Share (%) of Agriculture and Allied Sector in Employment and GDP are presented in **Table 6**.

**Table 6: Share of Agriculture and Allied Sector in Employment and GDP
(Percentage of Share)**

Decade	Share in GDP	Share in Employment
1951	51.9	69.9
1961	46.3	69.5
1971	40.5	69.7
1981	35.4	60.5
1991	28.5	59
2001	22.4	58.2
2011	14.4	54.6
<i>Source: Registrar General of India and CSO</i>		

As per the **Table 6** it is understood that share of agriculture in GDP has been on declining trend from 51.9 % during 1951 to 14.4% in 2011, however the percentage of population employed in agriculture and allied sector has not fallen that speedily which signifies the challenges of unemployment, underemployment and disguised unemployment. In 2016, as per **Table 1**, 43.44% of total employment is met by agriculture sector. This is a serious challenge not addressed for the last a few decades.

g) Share of India's Agricultural Exports/Imports in World Exports/Imports (%) is provided in **Table 7**.

Table 7 : Share of India's Agricultural Exports/Imports in World Exports/Imports (%)

Year	1980	1990	2000	2014
Exports	1	0.8	1.1	2.5
Imports	0.5	0.4	0.7	1.5
<i>Source: International Trade Statistics 2015, World Trade Organization (WTO)</i>				

As per the **Table 7** it is interpreted that Indian agriculture exports was ranging from a meager 1% in 1980 to 2.5 % in 2014 and imports were from 0.5% in 1980 to 1.5% in (2014). This implies that the produce is maximally consumed domestically and no surplus for exports and or the lack of motivation and encouragement to innovate the value addition processes at international standards for the agricultural produce to do exports.

From the above analysis, it is revealed that agriculture in India, after 70 years of independence, has not been focused fully and simply neglected and hence farming is not vied as business rather is an unprofitable burden.

Root Causes of Unprofitable Agriculture

It was found that there are many causes for the failure or unprofitable agriculture and is discussed as follows:

1) Excessive Dependency on Land

The heavy dependency of population on land is a major cause for the limited growth of employment opportunities in the non-agricultural sector for rural people and disguised employment and under employment in the agriculture.

2) Fragmentation of Land Holdings

The rapid growth of rural population low literacy and education are major factors for the fragmentation of land holdings resulting in low productivity and unprofitable agriculture. Further it is observed in table 8 that marginal land (less than 1 hectare) holding is more than 67% followed by small (between 1 and 2 hectares) 18%, semi-medium (2 to 4 hectares) 10%, medium (4 to 10 hectares) 4% and large (> 10 hectares) 0.7%. Hence 80% of the agricultural holdings are in less than 2 hectare which is far less than optimum size of the holdings for a profitable agriculture. Refer **Table 8**.

Table 8: Number and Area of Operation Land Holdings (%) - India

Category	2000-01	2005-06	2010-11	Size (No of Hectare)
Marginal	62.9	64.8	67.1	< 1 hectare
Small	18.9	18.5	17.9	1 to 2 hectare
Semi-Medium	11.7	10.9	10	2 to 4 hectare
Medium	5.5	4.9	4.2	4 to 10 hectare
Large	1	0.8	0.7	> 10 hectare
<i>Source: Department of Agriculture, Cooperation & Farmers Welfare [Agriculture Census 2010-11 (Phase-1)]</i>				

3) Superstitious beliefs and resistance to technology adoption are also limiting factors for the low agricultural productivity and unprofitability nature of agriculture.

4) Land Degradation due to heavy usage of chemicals based fertilizers and pesticides which also spoiled the quality of the soil and hence no profitability of the agriculture.

5) Lack of infrastructural facilities such as transportation facility, electricity and power causes for the loss in agriculture.

6) Indian farming is subsistence in nature implying that the majority of the farm produce is consumed for the domestic needs. Hence nothing is surplus to sell or to look for value addition.

7) Low and inadequate agricultural capital formation due to no profitability in agriculture, the propensity to save on the part of farmers found to be negative and lack public participation in agriculture resulting in insufficient capital formation. Further its contribution India's GDP is hardly 16% and is declining incessantly.

8) Inadequate credit and marketing facilities forces the farmers to barrow from indigenous bankers for high rate of interest and lack of marketing guidance the farmers sell to local mediators for lesser prices and finally landing in losses.

9) Increasing cost of agricultural inputs such as cost of seeds, fertilizers, pesticides and other factors.

- 10) Lack of minimum support price is another major reason for the losses to the Indian Farmers.
- 11) Unscientific use of fertilizers and pesticides due to lack of education and knowledge of the use of those inputs make the crops low yielding with low quality.
- 12) Lack of sufficient irrigation facilities

In **Table 9**, the details of irrigated land and different sources are provided. It is interpreted that tube wells are the major source of irrigation followed by other wells, canals however the Indian agriculture majorly is rain-fed (more than 50% arable land is rain-fed). Further uncertainty of monsoons also is one of the crucial factors for less productivity and losses.

Table 9: Net Area Under Irrigation by Sources (000 Hectares)

Year	Canals	Tanks	Tube Wells	Other Wells	Other Sources	Net Irrigated
2001-02	15202	2196	23245	11952	4342	56936
2002-03	14073	1811	25627	8727	3658	53897
2003-04	14458	1916	26691	9693	4299	57057
2004-05	14766	1734	25235	9956	7538	59229
2005-06	16718	2083	26026	10044	5966	60837
2006-07	17027	2078	26942	10698	5999	62744
2007-08	16748	1973	28497	9864	6107	63189
2008-09(p)	16881	1981	28367	10389	6020	63638
2009-10(p)	14978	1587	28371	9992	7008	61936
2010-11(p)	15643	1980	28543	10629	6864	63659
2011-12(p)	16005	1919	29943	10595	7236	65697
2012-13(p)	15672	1753	30543	10763	7536	66266
2013-14(p)	16278	1842	31126	11312	7542	68100

Source: Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare. & p = provisional

Further the in **Figure 1**, it is shown that major crops grown in India where rain-fed cultivation is observed to be dominant except wheat, so long this challenge is prevailing, agriculture is difficult to be profitable.

Besides the above mentioned, there are miscellaneous causes for the lack of proper focus on agriculture for its lagging behind. Present the Indian agriculture economy is badly in need of professional, scientific and managerial approach to farm management.

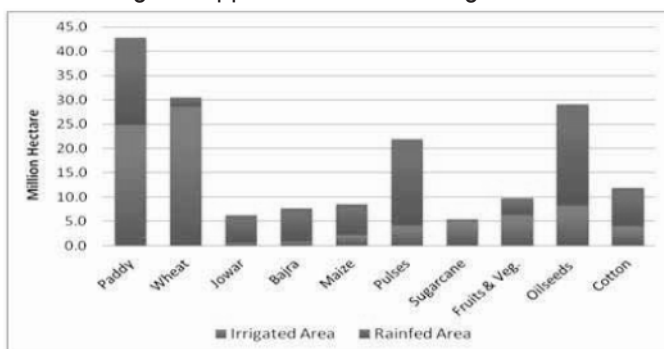


Figure 1: Irrigation Vs Rain-fed Cultivation

Source: Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare.

Review of Literature on Profitable Agriculture and Best Management Practices

The research works of (Bhalla and Singh, 2009; Reddy and Mishra, 2009; Vaidyanathan, 2010) advocates for the continuous growth and development in agriculture. Further they felt the need of sustainable growth in farm sector through constant and consistent policy and institutional support to accelerate the growth in the rural economy which is possible by innovative value addition process and integrated marketing techniques.

Rao, (2003) in his work revealed that lack of infrastructure meant for agriculture, insufficient budget allocation and lessening spending are some of the reasons for the low or stagnant growth of agricultural sector. The similar studies are found from Vyas (2001), Mahindra Dev, (2000), and others.

The study by Chand and Raju, (2009) revealed that the adoption of agricultural technology will definitely show the growth in the output of a crop.

Gollin et al., (2002), in their research work found that the transfer of labour force from agriculture to non-agriculture especially the manufacturing sector had brought enhanced productivity growth in agriculture and resulted higher income.

Bhalla and Singh, (2009), have cautioned about the shift from coarse cereals to high value crops is likely to increase farm output and income to farmers, but in dry land regions the same thing is risky because high value crops have a high water requirement in most of the crops.

Thus the review of the selected research works reveals that sustainable growth is possible in farm sector with constant and consistent policy and institutional support, encouragement for innovation in value addition process by establishing micro and small food processing units in villages so as to shift excess labour from farm sector and with innovative and integrated marketing tools to market the processed products and meticulous care in using farm resources such as water and technology to increase the yield.

Management Practices to Make Indian Agriculture Profitable

Farm management is defined as, the science of organizing and controlling the resources of a particular farm or holding so that they yield for the enterprise as a whole either the greatest continuous profit or that profit which the farmer desires.

Butterfield, (1910) has defined farm management is concerned with “how can the individual farmer so organize the factors of production - land, labour and capital - on his farm, so adapt practice to his particular environment, and so dispose of his product, as to yield him the largest net return, while still maintaining the integrity of his land and equipment”.

However Ritson, (1977) has defined farm management “is the approach to agricultural production which is designed to assist the individual farm firm in meeting its objectives”.

In a nutshell, farm management is the application of principles of management and economics to attain the objectives of the farmer.

Strategy Scheme to Market Orientation and Best Management Practices

The special institutions like agricultural universities, research institutes, Krishi Vigyan Kendras (KVK) have been striving and keeping incessant research efforts and innovate abundant technologies to

perk up the productivity and profitability of the farmers. But the question is whether the innovations and technologies are reaching the farmers. Enhancement in agricultural productivity and profitability can be achieved through the following:

1) Blending practical experience with scientific technologies in consultation with KVKs, for example, there are new methods of farming evolved such as hydroponic and aquaponic methods of farming aiming for more yield with less area of land and controlling the temperature of the cultivated area by the use of green houses and or poly houses whereby pests threat can be minimized for the healthy growth of plants and yielding maximum crop. The **Figure 2** depicts about aquaponic cultivation which is the combination of aqua culture and of hydroponic wherein the used water of aquacultures after removing ammonia is shifted to plants and again from there the water is re-shifted (because in hydroponic soil is not used for the growth of the plants) to aquaculture whereby the use of water is minimized. This is called integrated farming technique.



Figure 2 : A Small, Portable Aquaponic System.

Source: <https://en.wikipedia.org/wiki/Aquaponics>

2) Efficient use of natural resources – Farm inputs such as land, labour, capital, equipments, tools, seeds, fertilizer, pesticide, livestock etc. we are living in the sharing world. The machinery such as ploughing equipments, tools tractors, etc meant for agriculture can be shared by the farmers on rental basis hence become cheaper for everybody. This arrangement can be done by an individual or group of farmers. This can also be looked after through micro finance hence interest rate will be less and can be maintained by educated youth who are trained in using the equipments and hence get employment opportunities in the villages.

Similarly Ag BSc graduates are to me trained in the feeding of fertilizers, pesticides etc for the healthy growth of the plants. The training should be specific with respect to different crops and the soil of the locality hence their suggestions would be risk-free to the farmers.

3) Adopting time specific management practices – related to Rabi and Kharif seasons, monsoon condition, and the good practices needed through the life cycle of the crops hence plants are reared pleasantly and healthier manner and yield good results. Post harvest requirements such as sorting, grading, drying, milling, packing, branding etc. all are to be taught to the farmers hence his produce gets transformed from commodity to product and marketability becomes easy. For example, there is good awareness about the uses of millets like, kodo millets, foxtail millets, and finger millets. One kg

of Kodo millets are sold for Rs.100 (more than the price of rice or wheat and whose cultivation cost is far less compared to that paddy or wheat) because of health benefits.

4) Giving priority for quality driven production so as to look for export opportunity to gain more revenue. For example red and yellow capsicum, yellow water melon, dragon fruits, Israeli dates, blood lime (red lime) and so on rare fruits and vegetables are demanded abroad. Farmers can be advised based on their soil condition what can be grown and hence they can maximize the income.

5) Adopting suitable farming systems include selection of crop that suits the soil, climatic conditions of the locality, availability of skilled labour, proximity to the market to sell the produce. The crops that we grow and yield on black soil cannot be the same on red soil. Hence farmers should be aware of their land soil and its strength and what crops he can grow and how much care he should provide to gain more income. They should be guided to search the buyers through internet and sell their produce for better price instead of depending solely on the local buyers.

6) Adoption of region or location specific technology implying such technology which is adoptable by the farming community. If the farmers belong to a tribe, (in tribal farmers literacy level will be zero) their farming techniques are purely traditional and completely manual. In such cases we cannot expect them using modern tools run electrically. Similarly we cannot expect every farmer to use poly houses or go for green houses. Based on the situation we can bring in modern methods gradually.

7) Market demand driven production – the produce which is demanded and easily and quickly be sold at good and attractive prices. For example sathavari, a medicinal plant is in good demand from ayurveda medicine producers like Patanjali, Himalaya Drugs, and Bydyanath etc. When we keep in touch with the business environment, we get updated about the demand and supply of various produce and according one can capitalize the opportunity.

8) Adopting low cost and no cost technologies include primitive and ancient technologies which are at zero or negligible cost, organic farming, integrated farming, micro irrigation, precision farming. In traditional agriculture farmers use animals instead of machines, and also use more simple methods to plant, collect, and sell the crops planted. Where as in modern agriculture, the farmers use hybrid seeds (developed through biotechnology) of the same plant, technologically advanced equipment, and uses pesticides etc.

9) Training in use of modern technology is very essential as the farmers in the country are with low education background specifically the preparation and sowing the seed, use of right fertilizer and pesticides at the right time and right quantity in right frequency to yield as per the expectations. Also new forming techniques like hydroponic farming and aquaponic farming with automation, use of drones in Precision farming to identify the each and every plant with its needs in terms of water, fertilizer for the effective and healthy growth of plants and trees, also if there is any threat of pests and its control and finally meeting the expected yields.

10) Better and fast credit facility from credit institutions to stop farmers going to money lenders at high rate of interest. Encourage the formation of SHGs among the marginal and small farmers and get connected to the concerned bank manager to smoothen the process of sanction of loans to speed up the economic and agricultural activity.

11) Irrigation facility through rain water harvesting by creating small pools as per the topology of the

farm land hence water can be flown from pond to down-slope farm land without using motor pump sets and electricity.



Rainwater harvesting in 'Jalkund' and utilization for vegetable cultivation

Figure 3 Rain water harvesting to a pool. Source: nicra-icar.in

Thereby (as shown in **Figure 3**) the cost of cultivation become cheaper and therefore farmers' income will increase.

12) Proper linkage between and among farmers, agricultural universities and research institutes to see that farmer is given right information at the right time to enable him to use the knowledge to chose better crops, better and cost effective farming methods, better seeds, fertilizers, pesticides (if necessary) for better yield to gain better income.

13) Cooperative farming marketing is the best solution by bringing together all the marginal and small farmers hence the size of the land will be optimum to undertake large scale operations of farming with automation tools and equipments with the latest technologies and modern methods to gain accelerated farm output. Similarly in marketing the farm produce also there will not be any challenge for the cooperative societies. They can deal corporate and bulk buyers for better prices and quick payments.

14) Local governments try to encourage and promote sustainable farm operations through appropriate incentives so as to make the farmers aware of appropriate input use, use of renewable energy, and emphasizing soil health.

15) Balanced use of organic and inorganic fertilizers may be permitted in view of its direct impact on soil fertility and slowly the farmers are to be transformed from totally inorganic farming to pure organic farming with which soil health becomes strong and farmers income also raises and the consumers' health be safe as they organic farm produce.

16) Training on farm financial management cost recording budget preparation and project preparation to apply for a loan from bank is very important hence one can look for filling the strategic gap during the crop life cycle to gain maximum revenue and avoid maximum loss or expense.

17) Crop insurance is very essential especially rain-fed land farmers. Awareness on various crop insurance schemes and the rules etc is explained in the simplest manner hence farmer should not feel that payment of premium is a loss for him rather it is a protection to him in case crop goes failure.

In **Table 10** the state wise insured area in million hectares is provided.

Table 10. State-Wise Insured Area 2014–15
(Area in Million Hectares)

Sates	Gross Cropped area	Area Insured	Percentage of area insured
Rajasthan	23.95	11.91	49.7
Bihar	7.78	3.74	48.02
Madhya Pradesh	23.13	10.62	45.91
Maharashtra	21.87	4.87	22.26
Karnataka	11.75	1.44	12.25
Gujarat	12.6	1.39	11.03
Uttar Pradesh	25.82	2.05	7.95
Andhra Pradesh	13.65	0.54	3.96
All India Level	194.4	45.34	23.32
<i>Source: Department of Agriculture, Cooperation and Farmers Welfare</i>			

As per the table in some states around 50% of the gross cropped area is insured such as Rajasthan, Bihar and Madhya Pradesh. In Andhra Pradesh not even 4% of the gross cropped area is insured. On all India basis only 23% of the gross cropped area is insured during 2014-15. This calls for immediate attention of the stake holders and policy makers to see that farmers show interest and feel that crop insurance is a financial protection scheme for them. This possible when insurance premium is small, a liberal sum assured to cover the full loss of the farmer (in case he loses), insurance rules are simplified and government funds a major part or full of the premium.

18) Awareness of the Govt schemes (both central and state) like subsidies for poly houses, drip irrigation systems, use of renewable energy in farming, growing millets and pulses, digging bore wells, incentives for horticultural crops and so on so as to enable and motivate the farmer to grow such crop (suitable to the soil) for which he can claim more financial benefit to minimize the cost of farming.

19) Technical workshops about soil testing, how to strengthen the health of soil, how to prepare seed, methods of farming, use of newly introduced farming equipment, introduction of new crops due to climate changes, profitable foreign fruits and vegetable farming, what care is needed for such crops etc periodically be organized in slack season at free of cost for the benefit of the farmers.

20) Based on the most frequently grown crops in the locality or district level standard cost for each variety of crops be estimated and kept in the Village Mandal Officer's office to access by the farmers hence they can chose the such a crop which can be grown with less capital, yielding high return at least for 20 year period for example, sathavari an Ayurvedic plant which requires Rs. 50000/- capital for one acre in the beginning and starts yielding revenue from 18th month onward a minimum of Rs 600K per annum per acre atleast for 20 years.

Similarly growing dates in Tamilnadu and Andhra Pradesh where summer temperature touché 450 C or more one can grow dates. Initial investment will be Rs.600k per acre for Israeli plantations and other equipments. Annual maintenance would be Rs. 100k per annum for a farm of 5 acres. After four

years the trees will start giving a minimum of 100kg per tree and 100 trees in one acre land and the price would be Rs 150 (least) per kg (Israeli seed date) yielding revenue of (Rs 200*100Kg*100 trees=) Rs 20 Lac per annum after maintenance expenses as in between the rows vegetables and millets with a crop cycle of 90 to 120 days can be grown and a part of this revenue after the cost of crop and maintenance will be additional. The initial investment of the date's garden will be recovered with in the first year itself. All these are possible when proper care is taken for the garden.

Conclusion

Earth is a miracle planet. We grow a variety of crops. In this planet there are small countries like Israel, Germany, Netherlands and Denmark have created miracles by growing crops with the highest yield per hectare. In the **Table 11** the yield of some of the crops grown in both Netherlands and India presented.

Table 11. The Agriculture Miracle: Netherlands vs India

Particulars	Netherlands	India	World Average
Land Sq KM	17960	1797210	
% of Agri Land	53.3	60.4	
Wheat Production in tonnes 2017			
World Rank	3	52	
Yield ton/Hectare	9.1	3.2	3.4
Tomato Production in Tonnes 2017			
World Rank	1	88	
Yield ton/Hectare	508.4	26	55.3
Potato Production in tonnes 2017			
World Rank	6	46	
Yield ton/Hectare	62	22.3	20.5
Onion Production in tonnes 2017			
World Rank	4	101	
Yield ton/Hectare	75.4	17.2	26.6
Source: https://epaper.timesgroup.com/Olive/ODN/TimesOfIndia/PrintArticle.aspx?doc=TOIBG/2019/02/13&entity=ar00406&ts=20190213021522&%E2%80%A6			

As per the table India is 100 times bigger than Netherlands in area and also in the cultivable land. But in wheat production Netherland is ranked 3 and India is 52 and in yield per hectare Netherlands is 3 times greater than India. Similarly in tomato, potato and onion crops India stands nowhere when compared to Netherlands. Indian farmers yet grow and learn a lot to follow the foot sprints of the Netherlands farmers. It seems they are doing this at the least cost by following 10000 years back farming methods developed in the Fertile Crescent, the region in the Middle East where agriculture and human civilizations flourished. Hope we do also learn those methods of farming and accomplish those heights in our agriculture.

References

- Bhalla, G S and Gurmail Singh (2009). Economic Liberalization and Indian Agriculture: A State-wise Analysis, Economic and Political Weekly, 44 (52) Pp. 34-44.

- Butterfield, K. L. (1910). Analysis of the Rural Problem, In Report of the first Annual Meeting, AMCE, American Farm Management Association.
- Chand, Ramesh and S S Raju (2009). Instability in Indian Agriculture during different phases of technology and policy, Indian Journal of Agricultural Economics, 64 (2), Pp 283-288.
- Gollin, Douglas, Stephen Parente and Richard Rogerson (2002). Role of Agriculture in Development, The American Economic Review, 92 (2), Pp. 160-164.
- Farmer's Handbook on Basic Agriculture published by Desai Fruits & Vegetables Pvt. Ltd. Navsari, Gujarat, India.
- Mahendradev, S (1987). Growth and Instability in Food grains Production: An Inter-State Analysis, Economic and Political Weekly, 22 (39), Pp. 82-92.
- Rao, V M (1996). Agricultural Development with a Human Face: Experiences and Prospects, Economic and Political Weekly, 31 (26), Pp. 50-62.
- Reddy, D Narasimha and Srijit Mishra (2009). Agriculture in the Reforms Regime Agrarian Crisis in India, New Delhi, Oxford University Press.
- Ritson, C. (1977). Agricultural Economics, London: Crosby Lockwood Staples.
- Vaidyanathan A (2010). Agricultural Growth in India, Role of Technology, Incentives, and Institutions. New Delhi, Oxford University Press.
- Raising Agricultural Productivity and Making Farming Remunerative for Farmers from NITI Aayog, Government of India 16 December 2015.
- The future of flying robots | Vijay Kumar | TEDxPenn, https://www.youtube.com/watch?v=sj3Pn_pogXw&list=PLP-fqPorDB_w7R5AEWPkr7MkqbDRut4mJ&index=12, Retrieved on June 3, 2019.
- Balakrishnan, Pulapre (2000). Agriculture and Economic Reforms: Growth and Welfare. Economic and Political Weekly, 35 (12), Pp. 999-1004.
- Chand, Ramesh, P Shinoj, Ashok Gulati and Kavery Ganguly (2011). Managing Food Inflation in India: Reforms and Policy Options. Policy Brief 35, National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi
- Deshpande, R S, M J Bhende, P Thippaiah and M Vivekananda (2004). Crops and Cultivation, State of the Indian Farmer A Millennium Study, Volume 9. Academic Foundation New Delhi.
- FAO (2009). State of Food Insecurity in the World 2009, Rome: Food and Agriculture Organization (FAO).
- Joshi, P K, Pratap Singh Birthal and Nicholas Minot (2006). Sources of Agricultural Growth in India: Role of Diversification towards High Value Crops, MTID Discussion Paper No. 98. Washington, D.C.: International Food Policy Research Institute.
- Kannan, K P (2011). Agricultural Development in an Emerging Non-Agrarian Regional Economy: Kerala's Challenges, Economic and Political Weekly, 46 (9), Pp. 64-70.
- Majumdar, Kakali and Partha Basu (2005). Growth Decomposition of Food grains Output in West Bengal: A District Level Study, Indian Journal of Agricultural Economics, 60 (2).

- Radhakrishna, R (2002). Agricultural Growth, Employment and Poverty: A Policy Perspective, Economic and Political Weekly, 37 (3).
- Rao, C H Hanumantha (1998). Agricultural Growth, Sustainability and Poverty Alleviation - Recent Trends and Major Issues of Reforms, Economic and Political Weekly, 33 (29 & 30), Pp. 1943-1948.
- Rao, C H Hanumantha (2003). Reform Agenda for Agriculture, Economic and Political Weekly, 33 (29), Pp. 615-620.
- Sawant, S D and C V Achuthan (1995). Agricultural Growth Across Crops and Regions: Emerging Trends and Patterns, Economic and Political Weekly, 30 (12), Pp. 2-13.
- Thamarajakshi, R (1999). Agriculture and Economic Reforms, Economic and Political Weekly, 34 (14), Pp. 2393-2395.
- Vaidyanathan A (1992). Instability in Agriculture: Extent, Causes and Consequences: A Review Article, Indian Economic Review, 27 (2).
- Vyas, V S (2001). Agriculture: Second Round of Economic Reforms, Economic and Political Weekly, 36 (14), 829-836.