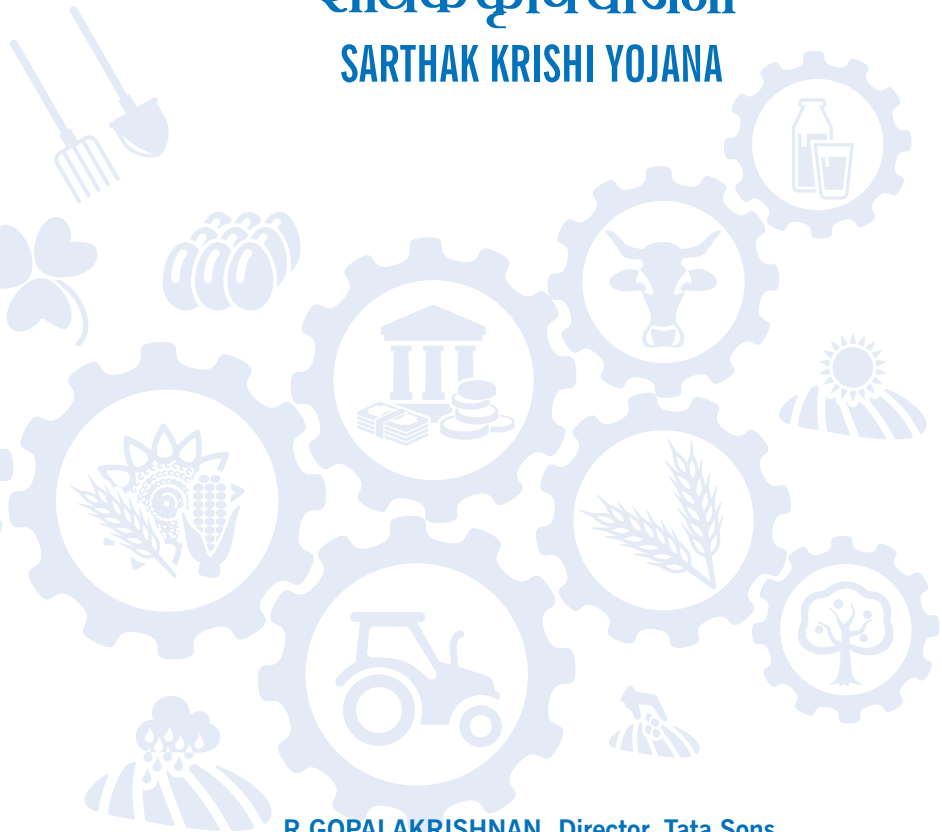


# What India can do differently in agriculture

सार्थक कृषि योजना  
SARTHAK KRISHI YOJANA

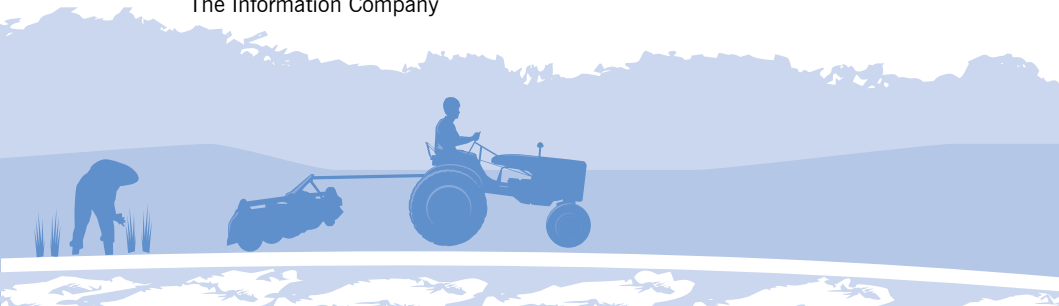


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# What India can do differently in agriculture

सार्थक कृषि योजना

SARTHAK KRISHI YOJANA





# Foreword

**A**griculture will surely be of great importance in the coming years. It is crucial to appreciate this reality. Although agricultural growth has been excellent since 2000, over the past two years, it has slowed. Back-to-back below-average monsoons during the past two years have strongly affected the Indian economy. It is fair to say urgent attention is required in this sector. After all, the agriculture and allied sectors account for a major share of employment. Positive agricultural growth is also linked to positive politics, as is suggested by experiences of Gujarat, Madhya Pradesh and Chhattisgarh.

We both come from very different professional backgrounds. We have had a common interest in agriculture, farmers and rural India. Between us we share many years of rural exposure and luckily have experienced complementary facets. We have had a common association working on corporate boards. Our exposure of several years to Indian agriculture has enabled us to share perspectives about issues facing Indian agriculture and what India can do about them.

Certain questions on agriculture arise naturally. First, more than half the workforce — 260 million people — is deployed in agriculture and allied sectors. There is an urgent need to upgrade skills in agronomic practices, soil / water / pest / nutrient management and post-harvest technologies. Yet, in the national



discourse on skill building we hear very little about upgrading agricultural skills. Second, India's agricultural exports account for about USD40 billion, which is 12-13% of India's exports. It surely has potential to increase if we can improve productivity and management systems. Yet, there is very little talk about agricultural production in the Make in India programme. Third, there is urgent need to expand financial inclusion in India. This can be significantly advanced if the farmer awareness is increased to form farmer producer organisations (FPOs) under the Companies Act. Such organisations can also become employers of trained and skilled agriculture workers. Yet, the drive to increase FPOs in India is not clearly visible.

Such questions generated much discussion between us. We have been struck by the fact that India has outstanding experts in all aspects of agriculture – farm economics, agricultural markets, finance and risk management, marketing of input and output, as well as science and technology. Agriculture and farming are connected to livelihood and social mores, which makes them very complex, with interconnections among various constituents.

Together we tried to answer three questions -

1. Although the past couple of years have been difficult for Indian agriculture, has it performed well in this millennium?
2. Indian agriculture productivity does not compare well with other countries. What is the problem with Indian agriculture?



3. In agriculture we must **do things differently**. What can be a national framework to execute a “mindful agriculture” programme (Sarathak Krishi Yojana) by better co-ordination among independent agencies and institutions?

Our conclusion is that agriculture does not suffer from a lack of ideas, funds or government initiatives. Current initiatives and institutions are fragmented and work in silos. There is need to work together, do things differently and get centres of expertise in credit, rural development, risk management, technology and training to work together. What could be strengthened is an integrated and holistic framework, which provides a managerial way of implementing changes.

We've tried to articulate an integrated framework in this paper and summarise key pillars of the framework. Many details remain, about which much has been written by experts. If the framework is worthy, then the details can be worked out and an implementation plan can be made.

To ensure the success of Sarathak Krishi Yojana, it should be a collaboratively driven project with the states, like Jan-Dhan Yojana, Atal Pension Yojana and Swachh Bharat Abhiyan. The nation may benefit by having a high level, collaborative organisation, like a Krishi Aayog, to articulate features and components of the pillars, seek consensus with states and



implement them as a comprehensive National Agricultural Mission. Such a move may instil enthusiasm in the sector and may invite participation.

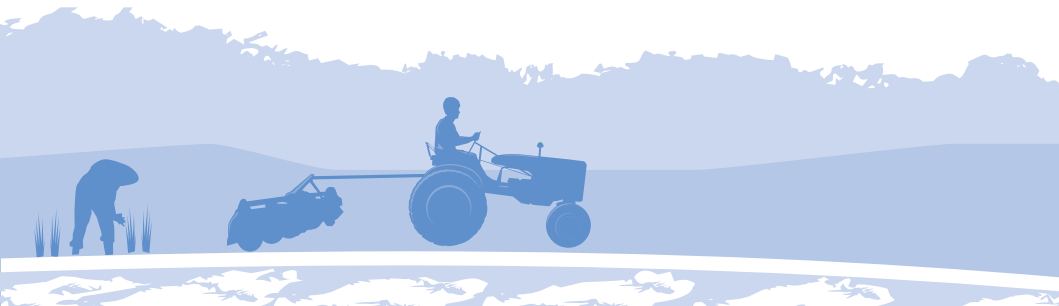
Parts of this paper have been presented at events organised by the Ahmedabad Management Association (April 2015), Bangalore International Centre (June 2015) and Bombay Chamber of Commerce and Industry (June 2015).

We are grateful to several experts for contributions to this paper. To mention a few, we acknowledge the influence of Dr YK Alagh's book, *The future of Indian Agriculture*, the significant contribution of experience by V Shankar (MD and CEO, Rallis India), KR Venkatadri (COO, Rallis India), Dr KK Narayanan (MD and CEO, Metahelix Life Sciences), Dr Siddhartha Roy (economic advisor, Tata group), and the research assistance of Aruna Parimi (Tata Services) and Rajiv Desai (Tata Sons).

**R Gopalakrishnan**

Mumbai  
October, 2015

**Dr YSP Thorat**





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## 1. A farmer's diary

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“ Sometimes one finds government servants who do not take bribes, but they are even more useless than those who do, because they are nonchalant and do not care about the poor farmer at all...I do not have enough money to feed our mother with good food as she prepares to die... Because I could not take proper care of the fields, the yield has decreased...the benevolent government should educate all the farmers until they become mature enough to use machines like European farmers...the government should build bunds and lakes so as to benefit both the farmer as well as the government...unless these things are done, the farmer's fated penury will not change, and the days of his starvation will never end.”

Guess the period when this diary was written? By a modern-day farmer or a farmer of the 1950s, so well portrayed by Balraj Sahni in *Do Bigha Zameen*? Some people think that this is today's Indian farmer. Others disagree.

Actually it is an extract from *Shetkaryacha Asud (The Cultivator's Whipcord)*, written by Jyotirao Phule in 1883!

It seems that the more things change, the more they seem to stay the same — whether it is with respect to farming or other issues.



## 2. Context matters

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Consider the following paradox:

- India<sup>1</sup> accounts for only about 2.4% of the world's geographical area and 4% of its water resources, but has to support about 17% of the world's population and 15% of its livestock. Agriculture consumes 80% of our water resources and 70% of our government subsidies.
- ~260+ million people, i.e., 55% of the total employed people in India are dependent on agriculture for their livelihood, whereas agriculture contributes only ~14% to India's GDP.
- Less than 50% of the net sown area is under irrigation.
- More than 75% of farmers have marginalised or small land holdings.

From the Indian agriculture perspective, these are the fundamental stresses primarily due to limited available resources and dependence of a large population on agriculture. Despite all the constraints the biggest success of Indian agriculture has been its ability to be self-sufficient in food grains. There is a perception of farm crisis in India, it is without a doubt that:

- India experiences cases of extreme poverty, distress and farmer suicides — these incidents are gut-wrenching.
- The conditions in rural India are also marked by growing ecological imbalance. Water shortage, depleted soil and

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<sup>1</sup>State of Indian Agriculture 2012-13, Government of India, Ministry of Agriculture  
Agriculture production estimates and agriculture statistics from the Ministry of Agriculture



fields, polluted water bodies and decreasing biodiversity are only some issues that are challenging the sustainability of agriculture.

Perceptions are influenced by time frames. If we look at the recent 15 years in the context of the last 150 years, we get a different impression as compared to looking at the last two years in the context of the last 10 years.

Through this paper we intend to bring forward an alternative perspective on agriculture and share our point of view on the following issues:

1. Although the past couple of years have been difficult for Indian agriculture, has it performed well in this millennium?
2. Indian agriculture productivity does not compare well with other countries. What is the problem with Indian agriculture?
3. In agriculture we must **do things differently**, what can be a national framework to execute a “mindful agriculture” programme (Sarhthak Krishi Yojana) by better co-ordination among independent agencies and institutions?



## 3. Has Indian agriculture performed well in this millennium?

---

### 3.1 India's Green Revolution ... a great success story

In 1961, India was on the brink of a mass famine and decided to begin its own Green Revolution. India's green revolution programme encompassed adopting high-yielding varieties of seeds, modern farming methods, irrigation development and financing of agrochemicals. It all began after a high-yielding variety (HYV) of wheat was first introduced in India in 1963 by American agronomist Dr Norman Borlaug, who is known as 'the Father of the Green Revolution'. India soon adopted HYV - IR8, a semi-dwarf rice variety, dubbed as the 'Miracle Rice' to further increase production and become self-sufficient. While the introduction of technology was fuelling India's drive towards self-sufficiency, it was the enthusiasm and entrepreneurship of the farmers who adopted it that mobilised the agricultural revolution in India.

### 3.2 Rural India and agriculture have done well since 2000<sup>2</sup>

From 1960 till date we have been able to sustain two generations so it is difficult to argue that we have not traded sustainably and sensibly as far as food production goes. India's food production (grains + pulses) growth has been well ahead compared to the population growth. However, production is vulnerable to drought and seasonality.

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<sup>2</sup> Agriculture production estimates from the Ministry of Agriculture  
India population estimates and census from the Ministry of Statistics and Programme Implementation



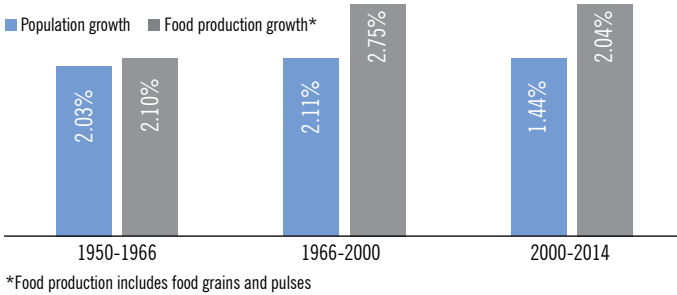


Fig no. 1. Food production growth is always ahead of population growth

In the 16 years of the pre-green revolution, between 1950 and 1966, the annual growth rate of agriculture was about 2%. In the 30 years of green revolution between 1966 and 1996, there was an increase to about 3% per annum. In the 20 years from 1996 till date, the growth rate has decelerated to about 2% per annum, but on a much higher base. Refer to Appendix E for further details.

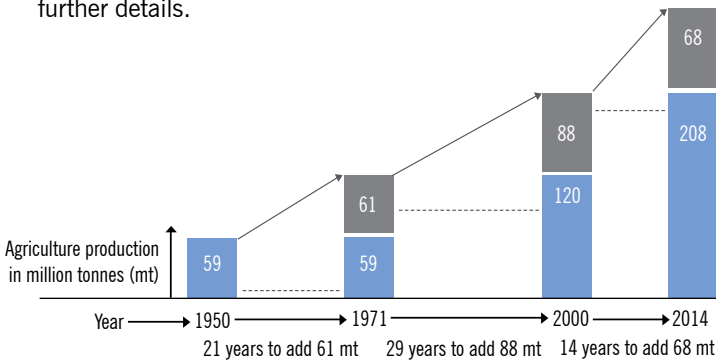


Fig no. 2. Accelerated rate of growing additional 65–80 million tonnes (mt) of food

Over the years we have seen an accelerated rate of growing an additional 65-80 million tonnes (mt) of food. Since 2000, India has halved the time required to add 75 million tonnes of food — from 25-30 years before 2000 to 14-15 years since 2000.

Though in the last few years from 2011-12 onwards the growth has been muted.

### 3.3 India ranks among the top two producers in several agricultural products<sup>3</sup>

It is well known that India has become self-sufficient in food grains over the last few decades. Less well known is that India counts among the top two producers in the world of wheat, rice, sugarcane, cotton, milk, fruits, vegetables and spices. Looking at these numbers, one gets the impression that India has done very well with respect to agriculture. Well, other countries have done better.

- China produces 30% more wheat and rice using 25% less land than India.

Agriculture production	India's rank	Next to
Wheat	Second	China
Rice	Second	China
Pulses	First	
Fruits and vegetables	Second	China
Sugarcane	Second	Brazil
Tea	Third	China, Turkey
Cotton (lint)	Second	China
Milk	First	

Table no.1. India's rank in the production of various agricultural products

- With landholding less than India, Japan and S Korea have better yields than India.
- India's average consumption of fertiliser is less than that in Pakistan and China.

<sup>3</sup>State of Indian Agriculture 2012-13, Govt of India, Ministry of Agriculture  
Reports from Ministry of Agriculture- Agriculture Statistics



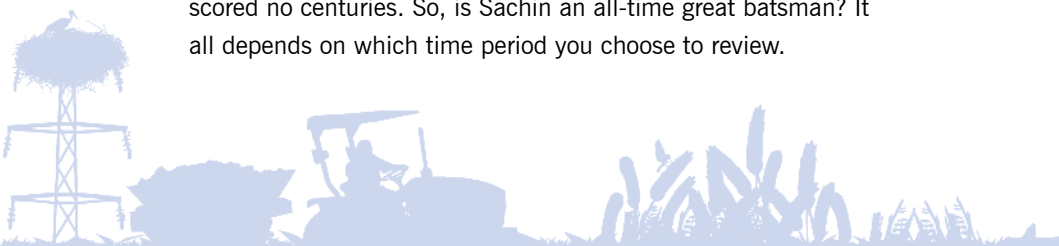
- India's per hectare agrochemicals consumption is one of the lowest in the world.

The higher growth elsewhere is driven by administrative and technological factors:

- Aggregation of land parcels.
- Improved crop protection / nutrient technologies.
- Adoption of technology-driven seeds and mechanisation.
- Expansion of irrigation.

Many Indian cognoscenti fret about what they consider to be the poor state of agriculture. They may be influenced by reports of farmer distress, soil degradation, environmental deterioration and volatility. After reaching a peak in agricultural growth in 1995, there was a deceleration in the growth rate (not the production) for 10 years till 2005, after which there has been a gradual recovery. However, over the last couple of years, agricultural growth has again been threatened by bad weather.

So the answer to the question whether Indian agriculture has done well depends on which slice of data you review. Metaphorically it is a bit like Sachin Tendulkar's batting record. In his cricketing career, Sachin comes out on top compared to peers. But viewing just his last 20 matches, Sachin's record is poorer than Brian Lara, Rahul Dravid, VVS Laxman and Ricky Ponting. His peers scored between 2-5 centuries, Sachin scored no centuries. So, is Sachin an all-time great batsman? It all depends on which time period you choose to review.





### 3.4 Rural per capita income has grown faster than urban<sup>4</sup> income

During the new millennium, rural per capita income has grown a tad higher than urban per capita income. Contrast this with the earlier period till 2000 when urban per capita income always grew faster than rural per capita income, by about four percentage points per annum. The reasons for the reversal are attributed to the high development funds allocated to the rural sector, higher MSPs, burgeoning subsidies and rapid growth of non-farm income in rural areas. On the debit side, the rise in farm input costs is noteworthy. On their part, farmers have acted entrepreneurially to favourably influence cropping intensity and crop diversification. Adoption of better technologies in nutrients, high-quality seeds, pest management and small-farm tractors have been hugely advantageous though some commentators dwell on their downsides.

Agriculture production	2000 over 1994	2012 over 2000
Rural per capita income growth %	10.79%	11.99%
Urban per capita income growth %	14.34%	11.19%

Table no.2. Rural v/s urban per capita Income growth

Anecdotal evidence for the prosperity of rural India can be seen through the higher reliance of FMCG companies on rural markets in their sales plans. But all this does not mean that farmers have no issues or that rural India has solved all its

<sup>4</sup>Report on 'Urban-Rural Income Differential in Major States' by the Indian Institute of Management - Ahmedabad



problems. Just as with urban life, there are many ills of life in rural India.

The reportage of recent weather adversities and Indian farmer suicides have clouded what could arguably be considered the best 14 years of agriculture. The picture is indeed mixed and there are many perspectives and arguments that are being advanced.



## 4. What is the problem with Indian agriculture?

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Although rural India in aggregation has experienced its most dramatic period in the last 15 years, Indian agriculture productivity does not compare well with other countries (section 3.3) and the benefits have not permeated uniformly (they never seem to do so). Therefore extreme poverty and distress are patently visible in rural India and among farmers.

Added to this is the exodus of youth and their distance from agriculture, which have resulted in a peculiar contradiction — excessive population in the rural areas and yet shortages of labour for agriculture. The extreme weather conditions have also affected farmers.

Therefore one would argue there are serious problems to be addressed in the farm and agriculture sector, but they are as much of a crisis as there are in several other areas. The public focus on farmer suicides and “India’s farm crisis” as a human tragedy can be viewed in more ways than one. The only unarguable fact is that it needs urgent attention through reform — but, unfortunately, so do many other areas.

### 4.1 Farmer suicides do not represent farmer crisis

The crisis is not about farmer suicides.

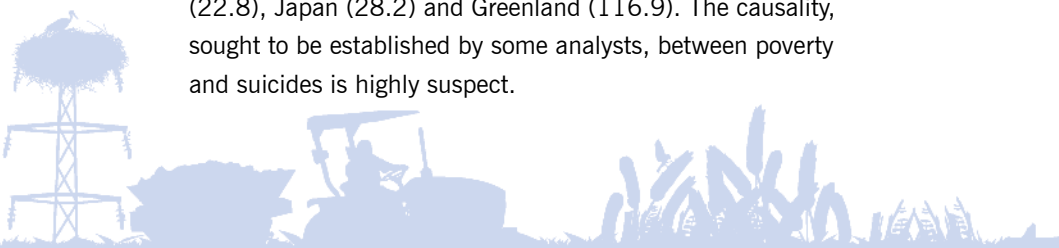
This sensitive subject is fodder for the political and media farm. Appendix A of this paper has details about the available data on suicides. Statistics tell us nothing until we understand what exactly is being counted. This is an important issue in reviewing farmer suicides.



The National Crime Register Bureau (NCRB) has been collecting data on all types of suicides since the 1950s. However farmer suicide data has been collected and published only since 1995, the year in which coincidentally, Indian agricultural growth rate peaked. In 1997, within two years of starting to collect data, one journalist famously declared, “We, as a nation, are in the worst agrarian crisis in four decades.” The narratives of various commentators since then suggest that suicides have become an epidemic. However independent researchers’ papers suggest that farmer suicides had been occurring even before 1960s.

Scholars question the accuracy of available data on suicides. In the absence of any other data, we refer to the published numbers. India experiences about 140,000 suicides each year. Out of these, 13,000 are farmer suicides. Interestingly, more than twice the number of farmer suicides, numbering 35,000, are urban suicides — due to disputes, jilted love and business rivalry. The rest of the suicides appear as illness, family problems and miscellaneous.

According to a WHO report (2000), “Globally, suicides account for one of the single biggest non-natural causes of death.” India is by no means, as some make out, the suicide capital of the world. WHO (2011) published data on suicides per 100,000 population. India ranks 46<sup>th</sup> with 10.3 per 100,000. Countries which have a higher suicide rate are USA (12.6), France (22.8), Japan (28.2) and Greenland (116.9). The causality, sought to be established by some analysts, between poverty and suicides is highly suspect.



## 4.2 Indian agriculture faces some fundamental problems which need far greater focus

One of the biggest successes achieved by India post-independence has been its ability to move from facing food shortages and food imports to that of self-sufficiency and exports of food grains in a rather short period. Indian agriculture has also moved away from subsistence farming to intensive and technology-led cultivation. Still there are some serious issues faced by Indian agriculture:

- **Larger population dependent on agriculture** - People are dependent on agriculture in India - ~55% of total employment across India and it contributes only 14% to India's GDP.
- **Fragmented landholding and inadequate irrigation** - More than 80% of farmers in India are marginal and small farmers. Inadequate irrigation makes it difficult for them to sustain farming.
- **Lack of institutional credit<sup>5</sup>** - Nearly 40% of all loans come from informal sources. Marginal landholding households suffer the most with only 15% of their credit from institutional sources such as the government, cooperatives and banks — for households with land more than 10 hectares the ratio is 79%.
- **Output uncertainty** - This is due to weather and other factors such as lack of market linkages, appropriate application of fertilisers, agrochemicals, etc.

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<sup>5</sup> NSSO Round (70<sup>th</sup> Report)

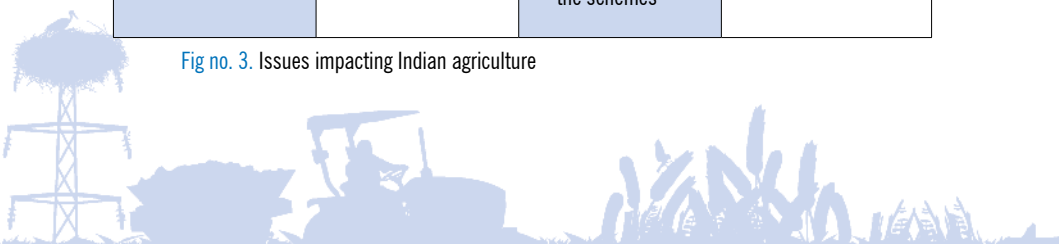


The critical importance of agriculture has been recognised by policy makers since Independence, and taken into account in successive five year plans and national development policies and programmes (Appendix F). Besides raising productivity and achieving self-sufficiency in food grains, the policies of the government has to address several other issues and challenges faced by the farmers, where it has not been successful to the extent it should.

Our system attempts to solve problems by increasing financial allocations to multiple schemes. While the allocation numbers may appear impressive and responsive, the inputs into these efforts have not necessarily been commensurate with the output, mainly because their conception and implementation have been piecemeal. The efforts have focused on mitigating individual symptoms, instead of promoting a cross-sectoral integrated and holistic strategy — one, for instance, that

Agriculture is complex	Inadequate factors of production	Multiplicity of schemes	Multiplicity of institutions
<ul style="list-style-type: none"> <li>● Farming associated with sociological issues</li> <li>● Number of people dependent on agriculture, all play a role</li> </ul>	<ul style="list-style-type: none"> <li>● Irrigation not expanding</li> <li>● Reduction in average landholdings</li> <li>● Institutional credit not widespread</li> <li>● Weather uncertainties</li> </ul>	<ul style="list-style-type: none"> <li>● Centre and each state have different schemes to benefit farmers</li> <li>● But the benefits of the schemes do not reach the farmer nor is the farmer aware of the schemes</li> </ul>	<ul style="list-style-type: none"> <li>● Several ministries and institutions in states and centre</li> <li>● Many actors but inadequate accountability</li> </ul>

Fig no. 3. Issues impacting Indian agriculture



addresses livelihoods, poverty, ecological sustainability and long-term food security at the same time. Expectation of the farmers for rapid change have increased and few questions need to be addressed:

- How exactly are our economic policies and frameworks designed to alleviate the farmer's problems?
- If 68% of the population lives in rural India, then agriculture and farming have to be considered a national priority.
- Much lower family income from agriculture compared to industry / service, coupled with rural ambition for faster growth (primarily driven by the spread of media and communication) is challenging the sustainability of agriculture.
- Why have government interventions over the six decades since Independence not been able to declare agriculture as an industry and turn it into a viable activity, particularly for small and marginal farmers?
- Do we have a national policy with respect to technology based on scientific temper or will opinions and politics rule forever?

#### **4.3 Agriculture urgently requires a holistic, focused national plan to be conceived and implemented in a mission mode**

In our opinion, the real problem in agriculture is the absence of a holistic framework, incorporating technology, risk mitigation, institutions, policies and technical training.

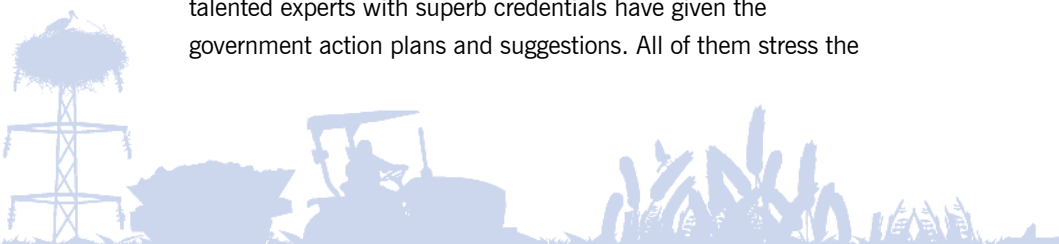


One symptom of the need to define policy, risk and institutions is the country's inability to scale up myriads of successful agricultural experiences all over the country. What is interesting to note is despite all these constraints and challenges there have been some great turnaround stories of how drought-prone villages have successfully managed to sustain agricultural activities. Though scaling up these models is another challenge.

The portability of positive experiences should be much better. For example, you read about the corn revolution in East Bihar, from Begusarai to Katihar, where rabi maize output has doubled from one million to two million tonnes just during this millennium. "The productivity per acre has almost trebled. Gulab Bagh maize *mandi* near Purnia is as vibrant as the eponymous Hathras or Rajpura because there is no APMC," reports a newspaper. (*An unlikely corn revolution*, Harish Damodaran and Santosh Singh, IE, June 4, 2015); likewise with SRI, which is a new *system of rice intensification* to save water in rice cultivation. Further details on agrarian issues and success stories are in Appendix F.

The nation needs a unified, national framework on agriculture, **Sarthak Krishi Yojana**. The content and details of this framework appear in section 5.

Do we have the experts in India who know what is required to be done? The answer is a resounding yes. Over the years, talented experts with superb credentials have given the government action plans and suggestions. All of them stress the





need for a National Agriculture Mission or Agricultural Reform. Many experts point to an aligned menu of actions. The National Commission on Farmers, chaired by Prof MS Swaminathan, submitted five reports during 2004-2006.

Therefore what is to be done can easily be put together by a national task force. The issue will then be of coordinated execution.

Nehru had said in 1947, "Everything can wait, but not agriculture." Indeed the first five year plan focused on agriculture. Now, after 60 years, things are not what was dreamt by the first prime minister. The benefits of addressing the problem were understood long ago.

An old Thirukkural quotation poetically illustrates: *"Tireless farmers, learned men and honest traders constitute a country. Wealth, large and enviable, and produce free of pests make up a country. The hallmark of an ideal land is where people voluntarily pay all taxes."*

India needs an economic movement that starts in villages, not one that bypasses them. There are policy, risk and governance issues to be addressed. Addressing risk will go a long way to alleviate the farmers' plight. As pointed out by Surjit Singh (*Reforming Indian Agriculture*, Sage Publications, 2008), there are five types of risks that the farmer faces in a liberalised India: Production / yield risks, price / market risk, institutional / policy risks, human risks and financial risks.



## 5. What can be a national framework to remedy?

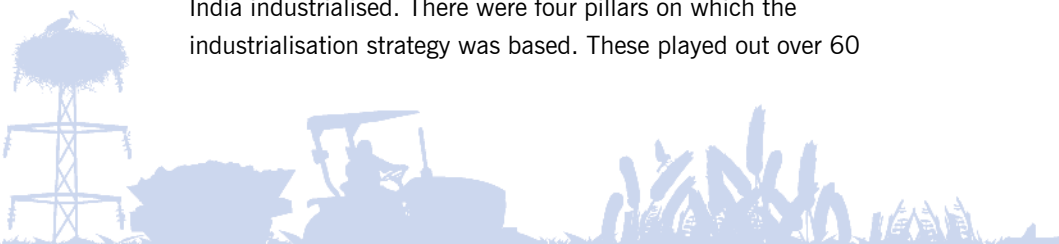
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Notwithstanding the availability of several expert reports, we would like to suggest a framework that can be populated with expert recommendations.

Unlike industry and telecom, agriculture is a state subject. The solutions as well as actions with regard to agriculture tend to get political and fragmented; they do not lend themselves naturally to a holistic design by a single agency. In this context, it is worth noting what Dr YK Alagh says in his book referred to in the footnote, “The future of agriculture is not in the stars, even in a country deeply committed to the inevitability of predictable karmic outcomes...pull together the main analyses and place them in a holistic framework...Indian agriculture responds well to well thought out policy stimuli.”

Developing a consensus with the states and executing a national agenda is an urgent option to be exercised by the central government.

In devising and executing any national policy, it is difficult to separate the many inter-related components. Undoubtedly they are all linked. However an integrated framework is helpful. A holistic national framework to address agricultural problems could derive structural lessons from the way India industrialised. There were four pillars on which the industrialisation strategy was based. These played out over 60



years, admittedly with flaws and strengths, but today India is counted among the top industrial powers in the world.

- T** – The first pillar was **T**echnology and an articulated approach towards adoption of new technologies.
- R** – The second pillar was the setting up of **R**isk and financing: Banks and development financial institutions to promote industry, general insurance, industrial safety and national standards institutions to mitigate risks.
- I** – The third pillar was the setting up of **I**nstitutions of governance: the Companies Act (1956), industrial reconstruction institutions and so on.
- P** – The fourth pillar was the formulation of an **I**ndustrial **P**olicy. What India would make; what roles would be assigned to the public, private and the SME sectors; who would approve; and very importantly what the technology policy would be. With respect to agriculture, I must emphasise the need for a clear national stance with respect to technology.
- S** – The fifth pillar was developing **S**kills — technical training. Setting up of a matrix of ITI skill development centres, industrial apprenticeship schemes and employment opportunities in industry.

Putting together a similar set of the pillars for agriculture could be helpful to aggregate the wisdom that already exists and to address the development issues that the nation faces.

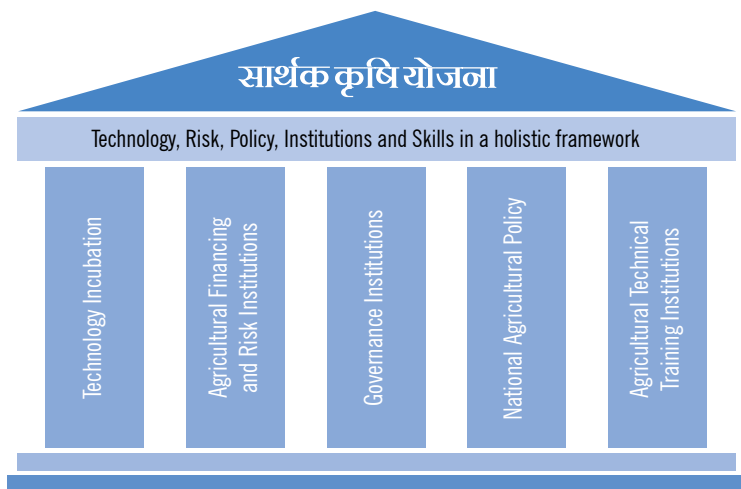


The holistic plan should encompass **T**echnology, **R**isk, **I**nstitutions, **P**olicy and **S**kills (*TRIPS*), and the nation needs a forward-looking Sarthak Krishi Yojana which encompasses five pillars:

- I. **T**echnology Incubation - outcome based technology policy encouraging research, innovation and incubation (details in Appendix B).
- II. **A**gricultural Financing and **R**isk Institutions - Banks and financial institutions to help promote technology infusion, insurance and mechanisation (details in Appendix C).
- III. **G**overnance Institutions - Actively promote farmer producer organisations (details in Appendix D).
- IV. **N**ational **A**gricultural **P**olicy - Focus on improving human and farm productivity (details in Appendix C).
- V. **A**gricultural Technical Training Institutes (**S**kills) (details in Appendix D).

To ensure the success of Sarthak Krishi Yojana, it should be a collaboratively driven project with the states similar to Jan-Dhan Yojana, Atal Pension Yojana and Swachh Bharat Abhiyan. The Prime Minister should consider setting up a high-level task force, may be a Krishi Aayog, to articulate the features and components that would constitute these five pillars, seek consensus with states and implement as a comprehensive National Agricultural Mission. This has the chance to instill enthusiasm in the agricultural sector and invite wide participation.





Technology adoption	Risk mitigation	Institutions of governance	Agricultural policy	Skill development
<ul style="list-style-type: none"> <li>• Clear policy with regard to new technologies in seeds, crop nutrition and protection</li> <li>• Promoting innovative research</li> </ul>	<ul style="list-style-type: none"> <li>• Use of IT for agriculture</li> <li>• Wider dissemination of crop insurance</li> <li>• More rapid financial inclusion</li> </ul>	<ul style="list-style-type: none"> <li>• Market intensively the idea of FPOs (Farmer Producer Organisations)</li> <li>• Spread successful knowledge and experiences</li> <li>• Improved access to markets</li> </ul>	<ul style="list-style-type: none"> <li>• Institutional collaboration between centre and state</li> <li>• Increase rural infrastructure v/s subsidies</li> </ul>	<ul style="list-style-type: none"> <li>• Set up agri tech training institutes</li> <li>• Improved employability</li> </ul>

Fig no. 4. Sarthak Krishi Yojana – five pillars



## 6. APPENDIX A:

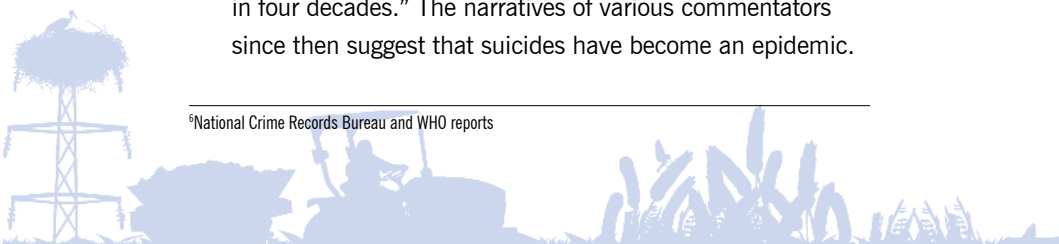
### The crisis is not of farmer suicides

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- i. To the regret of every right-thinking Indian, our society has several urgent and distressing problems. Scholars question the accuracy of available data on suicides. Despite this, for a few moments, I refer to the published numbers. I understand that India experiences about 140,000 suicides each year. Of these, 13,000 are farmer suicides<sup>6</sup> and 35,000 are urban suicides — due to disputes, jilted love and business rivalry. (The balance appear as illness, family problems and miscellaneous).
- ii. Some commentators on farmer suicides have portrayed the painful reality that every 30 minutes, an Indian farmer commits suicide. That is correct, but is to be seen in context.
- iii. The occurrence of deaths through all of these causes underscores the societal urgency to remedy the situation. It is tragic that when a society encounters too many urgent issues, its capacity to respond with alacrity is affected. It gets overwhelmed. India must guard against this danger.
- iv. The National Crime Register Bureau (NCRB) has been collecting data on suicides in general since the 1950s. However, farmer suicide data has been collected and published only since 1995, the year in which coincidentally, agricultural growth rate peaked. In 1997, within two years of starting to collect data, one journalist famously declared his view, “We, as a nation, are in the worst agrarian crisis in four decades.” The narratives of various commentators since then suggest that suicides have become an epidemic.

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<sup>6</sup>National Crime Records Bureau and WHO reports



- However independent researchers' papers suggest that farmer suicides have been occurring even before 1960s.
- v. Data as published by NCRB shows that farmer suicides increased from 11,000 in 1995 to 18,000 in 2005; thereafter they steadily decreased from 18,000 back to 11,000 by 2013. However the people who accept the increase in suicides reject the accuracy of the decrease in suicides.
  - vi. In June 2015, Brookings India published its Impact Series Paper on farmer suicides - *A Reality Check on Suicides in India*, Dr Shamika Ravi, <http://www.brookings.in/impact-series-post/farmer-suicide-contagion-in-india/>. Its findings are startling, for example, *first* "Housewives comprise the largest share of suicides (18%) while farmers comprise 11%"; *second* "Suicides among most demographics are declining over time and farmer suicides are declining the fastest"; *third*, "Suicide contagions can occur if suicides are overly dramatised and / or played up"; *fourth*, that suicide rate per lakh is higher in richer states like Maharashtra and Andhra than poor states like Bihar and UP; and *last* "research shows that responsible media coverage of suicides can play an important role in curbing suicide contagions."
  - vii. According to a WHO report (2000), "globally, suicides account for one of the single biggest non-natural causes of death." India is by no means, as some make out, 'the suicide capital of the world'. According to WHO (2011), which publishes the incidence of suicide per 100,000 population, India ranks 46<sup>th</sup> with 10.3 per 100,000. Countries which have a higher suicide rate are USA (12.6), France (22.8), Japan (28.2) and Greenland (116.9). The



causality sought to be established by some analysts between poverty and suicides is highly suspect.

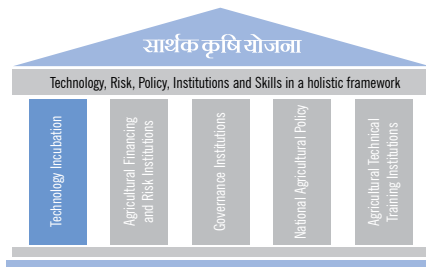
- viii. It is not just suicide in general that is a global issue but even farmer suicides seem to have a global angle to it. Terezia Farkas has quoted in *Huffington Post* last year, data from *Newsweek*, “In the US, the rate of farmer suicides is just under two times that of the general population. In the UK, one farmer a week commits suicide. ...In France, a farmer dies by suicide every two days.”
- ix. According to Ilan Greenberg’s report on December 3, 2013 in the *Modern Farmer*, “India is not the only place that has seen farmers commit suicide at alarming rates....The French research institute INVS reported that French farmers commit suicide at a rate which is 20% higher than the general population....Australia, which overall has one of the highest suicide rates in the world, has an even higher rural suicide rate....British farmers are twice as likely to contemplate suicide against the overall population....”
- x. According to Behere and Bhise (*Indian Journal of Psychiatry*, Oct-Dec 2009), “Various risk factors act in cohesion to culminate into suicide by farmers. Farmers’ suicide is a global problem that needs detailed evaluation.... It is high time now to take steps, otherwise we may be facing....the extinction of food growers.”
- xi. Tragic as they are, farmer suicides are not the real issue or evidence of the agrarian puzzle.





## 7. APPENDIX B: Technology Incubation

India has a large and diverse arable area. We have the largest acreage for many important crops. However, the productivity of most of these crops rank



among the lowest in the world. This is in spite of impressive gains made during the Green Revolution years. During the decades of the 1970s and 1980s, productivity of our staple cereals grew by over 3% every year. This was largely due to the introduction of high-yielding varieties (HYVs) of rice and wheat. It appears that the easy gains of HYV technology have already been reaped. Recent history shows that infusion of new technology has often resulted in dramatic increases in agricultural productivity. The science of genetics and its application to crop improvement is probably the single-most important factor that helped belie the Malthusian predictions of hunger, famine and the consequent anarchy in many parts of the developing world. One should therefore seriously consider technological options, including agricultural biotechnology, to overcome the present yield barriers.

An important feature of agricultural biotechnology is that the improved traits are inherent in the seed, the primary input for agriculture. For most crops, the seed is the cheapest of



all inputs and genetically altered seeds do not call for any modification in the cultural practices that farmers are used to. Further, the cost of seed is linearly proportional to the size of the holding. Therefore, any value addition that takes place through the seed, as is the case with agricultural biotechnology, would be scale-neutral. This is of special significance to a country like ours, where agriculture is fragmented and the average holding is very small.

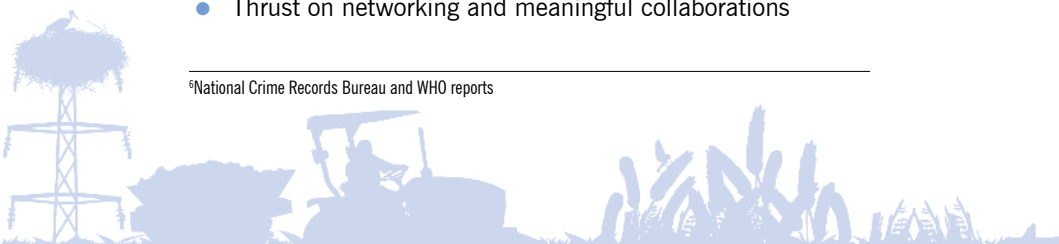
Adoption of modern technologies and infrastructure such as hybrid and genetically modified crops, precision farming (using sensors and GIS-based soil, weather, and water data to guide farming decisions), mechanisation and mobile internet-based farm extension and market information services will be the key to generating more value in agriculture.

*India needs an integrated, outcome-based technology policy encouraging research, innovation and incubation of modern technologies relating to soil, water, pest and nutrient management, seeds, and biotechnology. The key features of the new policy should be:*

- Promoting innovative research – leverage the scientific talent in crop biotechnology, combined with the low cost of innovation.
- Funding for projects and capacity building.
- Focus on products or solutions for specific agricultural problems.
- Thrust on networking and meaningful collaborations

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<sup>6</sup>National Crime Records Bureau and WHO reports



between the public and private institutions.

- Outcome-oriented coupled with measurable milestones.
- Leverage the state's extension machinery to promote modern technologies in agriculture.
- Streamline the current responsibilities, provisions and jurisdictions of various agencies and acts such as the national Biological Diversity Act, National Bureau of Plant Genetic Resources, plant protection / quarantine authority, etc.

The availability of scientific talent in crop biotechnology, combined with the low cost of innovation compared to the developed world (which may continue for some more time and needs to be leveraged), can significantly reduce the cost of product development. In the context of a big agrarian economy like ours, the really big and long-term value is in developing products tailored to the needs of our agricultural sector, though the research done in India can serve the global market as well.

However, for the realisation of this potential in any substantial measure, the rules and regulations governing the exchange of plant parts and tissues, and export of research material, including seeds, needs to be clearly laid out. Further, the responsibilities and jurisdictional limits of various agencies like the National Bureau of Plant Genetic Resources and the plant protection / quarantine authority, which are involved in this process, should be clearly delineated.

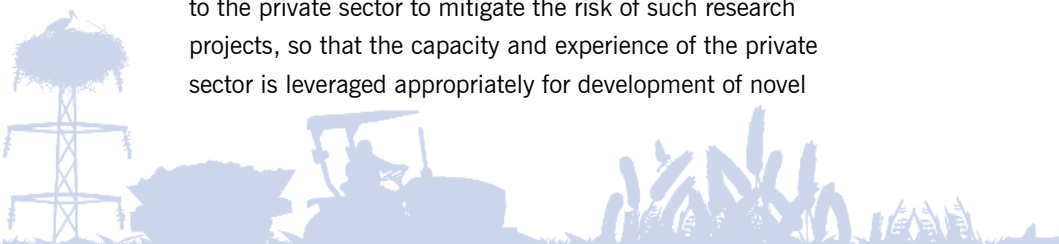
The national Biological Diversity Act and its implementation acts as a serious impediment to crop improvement research.



Ambiguity in several provisions leaves scope for arbitrary interpretation and needless discretion with the implementing officers.

We have many public institutions that have the competence to develop genetically improved crop varieties, using all the modern tools that plant biology has to offer. However, very few useful products have been commercialised by these institutes over the years. Often, it has been the lack of product focus that leads to the wasteful dissipation of limited resources that has resulted in this situation. While funding for projects and capacity building needs to be increased, there must be an immediate review of projects to bring about a focus on products or solutions to specific agricultural problems. There should also be a thrust on networking and meaningful collaborations between public and private institutions. Support for applied research projects should be based on ‘outcome-oriented’ reviews based on clearly laid out, measurable milestones.

In recent years, the private sector has also made significant investment in agricultural research. Such investments are beginning to bear fruit. However, resource constraints, and high risk perception, especially in value capture for agricultural technologies in this country, have made the private sector take a rather cautious approach to research. Innovative ideas, which are usually attended by a high risk of failure, are often not pursued. There must be more government support directly to the private sector to mitigate the risk of such research projects, so that the capacity and experience of the private sector is leveraged appropriately for development of novel



products in agriculture. Initiatives of the Department of Biotechnology (DBT) like Biotechnology Industry Research Assistance Council are welcome steps in this direction. More needs to be done.

A key driver of technology innovation is an appropriate intellectual property (IP) protection system. The Plant Variety Protection and the Farmer's Rights Act of 2001-02, which is currently in force, afford limited protection. Certain ambiguities in its provisions that can cause potential confusion in its enforcement need to be corrected. The value capture system is often vitiated by government actions like price control. Harmonisation among states, and states and the Centre, on such issues, can improve predictability on the return on investment in developing improved seeds.

Regulatory uncertainty can be a big dampener for innovation and technology development. An effective, well-defined regulatory process, which is science-based and time-bound will be a big boost to new technologies in agriculture. The trade-offs of different technology options have to be objectively debated and any ambivalence in the government's position must be cleared. This can also be an opportunity to correct some of the deficiencies of that draft through wide consultation with the different stakeholders for instance; the BRAI (Biotechnology Regulatory Authority of India) Bill has to be revived.



A good regulatory system should promote technology and ensure safe adoption of technology, and not create unnecessary hindrances and brakes in the system.

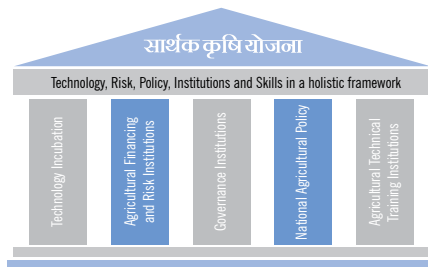
The state's extension machinery should be leveraged to promote modern technologies in agriculture. The subsidy schemes can be so designed to promote yield-enhancing and value-adding technologies. The state has to play a more proactive role in communicating the value of new technologies and in dispelling myths and mis-information.



## 8. APPENDIX C:

### Financing and Risk Institutions and the National Agricultural Policy

Indian agriculture can be subsumed in two words - low productivity and high risk. Breakthrough can, therefore, only be premised on a productivity-led agricultural growth policy.



In this appendix we detail the following two pillars of Sarthak Krishi Yojana:

- II. Agricultural financing and **Risk** Institutions - banks and financial institutions to help promote technology infusion, insurance and mechanisation.
- IV. National Agricultural **Policy** - focus on Improving human and farm productivity.

#### 8.1 Risk institutions

Agriculture is subject to several sources of risk — the risk of not realising the expected yield, or the expected price, or the expected quality of output; or deterioration of the output during storage and transportation; and input risks of various types.

Crop insurance is a mechanism to mitigate the risk of not realising the expected yield. Other sources of risk can be mitigated by other instruments like MSP for price risk. There



are some risks for which there are no feasible risk transfer mechanisms, so such risks have to be self-insured by farmers

### **8.1.1 Existing crop insurance schemes**

Crop insurance in India has two unique features, not necessarily found in other countries of the world — credit insurance linkage and an element of compulsion in the insurance cover for loanee farm.

Both these features are inescapable. From a purely cost angle, it is not viable for an insurer to approach individual farmers to solicit business, collect premiums, assemble claim reports, conduct individual loss-survey assessments and pay individual claims. Equally, the need of farmers for cash and the absence or volatility of it is so acute, particularly at the start of the cropping season, that they are not inclined to pay premiums on a voluntary basis.





## A snapshot of existing crop insurance schemes

NAIS (National Agricultural Insurance Scheme)	MNAIS (Modified National Agricultural Insurance Scheme)	WBCIS (Weather Based Crop Insurance Scheme)
<b>Key features</b> <ul style="list-style-type: none"> <li>• Yield based</li> <li>• Non-actuarial premium (administered)</li> <li>• Compulsory for loanee farmers</li> <li>• Premium: (1.5-3.5%)</li> </ul>	<b>Key features</b> <ul style="list-style-type: none"> <li>• Actuarial premium rates</li> <li>• Village panchayat</li> <li>• On account settlement of claims upto 25% of likely total claims</li> <li>• Premium: (8-11%)</li> </ul>	<b>Key features</b> <ul style="list-style-type: none"> <li>• Reference Unit Area (RUA) — homogenous unit of insurance</li> <li>• RUA linked to reference weather station</li> <li>• Premium based on actuarial rates</li> <li>• Premium: (8-10%)</li> </ul>
<b>Challenges</b> <ul style="list-style-type: none"> <li>• Large insurance unit area</li> <li>• High claim / premium ratio (non-sustainable business model)</li> <li>• Delay in payments — based on CCEs, moral hazard</li> </ul>	<b>Challenges</b> <ul style="list-style-type: none"> <li>• High premium rates</li> <li>• Reduction in sum insured in case the actuarial premium rates exceed the capped premium rates</li> </ul>	<b>Challenges</b> <ul style="list-style-type: none"> <li>• Low density of weather stations</li> <li>• High premium rates</li> </ul>

Fig no. C. 1. Current crop insurance schemes

## Shortcomings of MNAIS and WBCIS

- Low coverage resulting in high premium rates.

Scheme (2012-14)	Season	Area insured (million ha)	Premium rates (%)
WBCIS	Kharif	11.17	10
	Rabi	6.49	8.4
MNAIS	Kharif	3.8	10.9
	Rabi	1.5	7.7



- Average time to settle a claim is 6–12 months.
- Opaque methodology for assessing damage.
- Sum insured is based on the cost of cultivation and loans and not on the prospective income, resulting in inadequate cover.

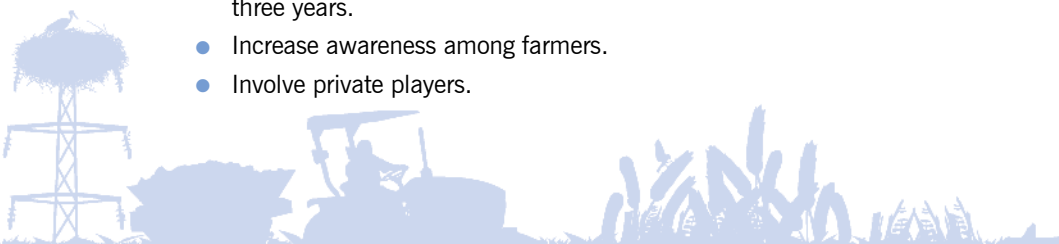
### **8.1.2 Need to transform crop insurance in India**

There is need to create products similar to Suraksha Bima Yojana or Jeevan Jyoti Bima Yojana. A successful crop insurance arrangement is based on:

1. Scale: The insured area has to be raised from 15 to 100 million hectares.
2. Speed: The process of crop assessment and compensation must be accomplished within two weeks.
3. Sustainability: The premise should build on a financially sustainable business model.
4. Satisfaction: Farmers' trust and satisfaction is gained through science-based, fast and affordable crop insurance.

Some of the features of a new crop insurance scheme/strategy should be:

- Increase area insured to 100 million hectares.
- Extend credit and insurance to non-loanee farmers.
- Generate awareness and improve insurance penetration in livestock and horticulture sectors.
- Insurance companies to be allotted a district for at least three years.
- Increase awareness among farmers.
- Involve private players.



- Digitisation of farmers land records using handheld GPS.
- Leverage technologies such as drones, radar-based sensing technology and low earth orbits to monitor and assess crop damage in real time.
- Crop modelling for each block on the basis of weather parameters.
- Cover market risks for MSP as well as non-MSP produce.

Overall the focus should be to ease the process of availing insurance and settling claims. Given below are some potential steps that can be taken.

- Payment by farmer of his / her share of premium by buying a crop-specific scratch card.
- Registration of this by sending an SMS with relevant scratch-card details.
- A centralised database will capture farmers' mobile numbers, crops, acreage, location (cell tower triangulation), unique code, date of planting (date of sending SMS) — authentication needed.
- Receipt of insurance policy via SMS by the farmer.
- Payment of premium in agreed proportion by GOI and state governments.
- Farmer's share of insurance for Rs40,000/hectare (sum insured) will vary between Rs200 and Rs400, depending on the premium.
- Receipt of SMS message by farmer if weather data indicates crop failure.
- Leverage technology to ascertain genuineness of crop failure photographs of land and crop along with the date of photograph taken via a hand-held device by the village head



or a designated functionary at the village level; then the images received can be matched with the survey records to establish the genuineness — or otherwise — of the insured.

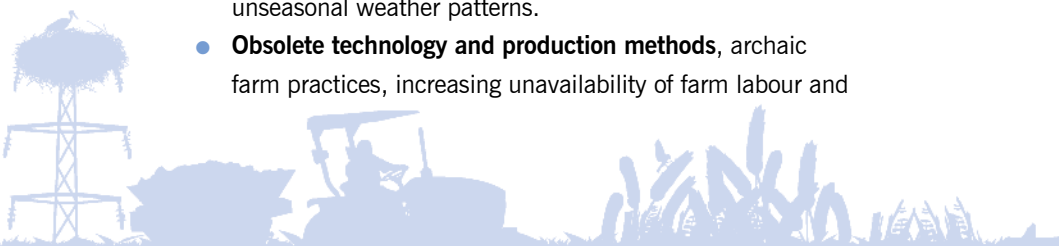
- Based on the weather triggers, payout will take place to farmers (cash transfer into bank accounts)
- Payment into his / her bank account verified by Aadhaar.

To implement the suggestions mentioned above, infrastructure spending on automatic weather stations, handheld GPS for land digitising and drone/remote sensing need to be done. The central and state governments spend about Rs2,500-5,000 crore / annum on premium subsidy and drought / unseasonal rainfall assistance. The above scheme will be beneficial for the government as well. The estimated revenue realisation to insure 100 million hectares could be between Rs5,000-10,000 crore.

## 8.2 National Agricultural Policy — productivity-led growth in the agriculture sector

Indian agriculture is characterised, *inter alia*, by:

- **Small farmers**, having geographically scattered, uneconomical landholdings. Declining size of landholdings without any alternative income-augmenting opportunity is resulting in a fall in farm income, causing agrarian distress.
- **High risk**, due to vagaries of the monsoon, (droughts and floods), decreasing predictability of weather on account of climate change impact and resultant emergence of erratic, unseasonal weather patterns.
- **Obsolete technology and production methods**, archaic farm practices, increasing unavailability of farm labour and



its rising cost, misuse / over-exploitation of ground water, unscientific irrigation, imbalanced use of fertilisers and pesticides leading to soil degradation and poor economies of scale in use of farm machinery, particularly by small holder cultivators.

- **Inadequate research**, no significant breakthrough.
- **Poor rural infrastructure** for power, roads, transport, storage.
- **Inadequate institutional arrangements** for increasing bargaining power of farmers, enabling them access to competitive markets, farm and crop-related information and extension services.

There is need to increase productivity in almost all crops through measures such as focused research; efficient management of water resources; balanced application of fertiliser and pesticides; aggregating farm operations and developing agricultural-services; strengthening the agri-equipment sector; commercialising agro-technologies developed by research institutes; supporting PPP in agricultural R&D in crops, fruits and vegetables; promoting agri-biotechnology; strengthening storage and logistics; reforming agricultural markets and significantly strengthening the risk-mitigation framework.

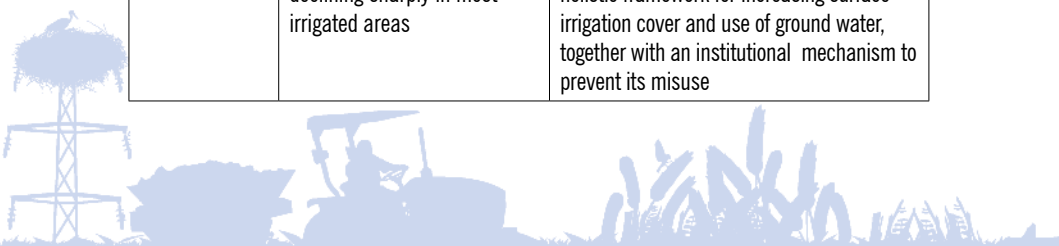


Consequently the National Agricultural Policy should focus on

Input side	Output side
<ul style="list-style-type: none"> <li>• Effective management of soil and water resources</li> <li>• Revamp dry land farming</li> <li>• Formalise and encourage land lease market for better inclusion and higher productivity</li> <li>• R&amp;D and commercialisation of agricultural biotechnology products</li> <li>• Fertiliser use and production</li> <li>• Pesticides - ease of registration and focus on reduction in spurious pesticides</li> <li>• Improve package of practices; extension</li> <li>• Promote adoption of mechanisation</li> <li>• Rationalisation of subsidies along with direct benefit transfer</li> </ul>	<ul style="list-style-type: none"> <li>• Food grain management — relook as MSP and PDS, encourage private participation</li> <li>• Agri warehousing — encourage PPP in storage and warehousing</li> <li>• Marketing — enable the right to sell anywhere and to anyone, whether at home or abroad; leverage technology to develop a national unified market</li> </ul>

Fig no. C. 2. National Agriculture Policy focus

Input side		
Policy agenda	Current issue	Suggestion
Management of soil and water resources	Soil quality is deteriorating	Policy to focus on ways and means for judicious exploitation and better management options regarding soil, soil health improvement measures and creating broad based awareness regarding soil testing
	Similarly, the water table and the quality of water is declining sharply in most irrigated areas	A shift in focus from yield per hectare to yield per liter of water. Policy to lay down a holistic framework for increasing surface irrigation cover and use of ground water, together with an institutional mechanism to prevent its misuse



Policy agenda	Current issue	Suggestion
Land use — dry land farming	Heavy reliance on rain-fed agriculture coupled with stagnant productivity of dry land crops	Revamp dry land farming initiative of the central government
Land lease market — inclusion and higher productivity	Absence of a formal lease market mechanism to enable “land poor but efficient producers” to optimally use land and contribute to agricultural growth	Policy to create an enabling legislative framework to allow land leasing on a long-term basis, enabling small and marginal farmers to retain their land ownership and receive a pre-negotiated lease rent when they lease their land, creating operational holdings of a size that will make productivity-enhancing investments economically viable
Emerging technologies - commercialisation of agricultural biotechnology products	Research in agricultural biotechnology, especially field trials, should be separated from the decision to commercialise agricultural and biotechnology products. Research must continue unhindered and be supported adequately	The extant policy and regulatory environment on the biotechnology front needs to be refocused and premised on the importance of science-based solutions and should facilitate private-sector participation and investment in research and development where deemed appropriate
Fertilisers	Fertilisers have helped to augment productivity over time; this has now plateaued. Domestic production of fertilisers in a financially sustainable and energy-efficient manner is a challenge	The stance of policy should be to reduce the dependence of the industry on the existing subsidy regime, ensure transfer of benefits directly to the farmers, encourage investments in nitrogenous sector by incentivising alternative feedstock-based production and commit part of future discoveries of gas to new investments



Policy agenda	Current issue	Suggestion
Pesticides	Stringent safety and bio-efficacy environmental acceptability evaluations for registration acts as disincentive for genuine manufacturers, resulting in a huge spurious pesticide market	The policy agenda for agro-chemicals needs to address the spurious pesticides market; focus on punishment of illegal importers of technical pesticide ingredients, particularly from China
Package of practices; extension	India has one of the largest extension systems in the world, but its effectiveness in addressing the needs of the farming sector leaves much to be desired. The capacity and outreach of public extension services is limited	Restructure and relook at the complete agri-value chain; explore PPP models  Coordinate timely delivery of farm inputs; replace the system of multiple licensing (for selling various farm inputs) by a single state-wide licence
Mechanisation	Adoption of modern agricultural practices and use of technology is constrained by shrinking and scattered holding sizes	Promote and implement custom hiring model in the agri- equipment sector  Adapt and customise farm machinery to local needs. Direct transmission of grants or financial assistance to entrepreneurs or customers
Subsidies	The question to be answered is whether incentives in the form of fertiliser and power subsidies are the best ways to compensate the farmer. Are they well spent on targeted groups? Are they directed towards R&D and irrigation where the long-term returns could be far higher?	Propose a framework for rationalisation of fertilisers (especially urea) and PDS food prices, alongside a move to direct benefit transfers in place





Output side		
Policy agenda	Current issue	Suggestion
Food grain management	MSPs (for select agricultural commodities) set above market levels have distorted the cropping pattern of agriculture commodities, leading to overproduction of food grains despite growing stocks in government godowns	Government to restrict procurement for buffer stock only and / or to meet emergency and PDS requirements
	It needs to be debated whether a fully public managed food grain management system is most efficient in delivering desired benefits to the people or whether there is a case for allocating defined areas of the system to a PPP framework	Encourage private sector participation, at least in states that have gone for decentralised procurement Simplify food movement throughout the country, do away with the concept of state-level food zones, promote direct cash transfer and transit out of physical distribution of grains
Agri warehousing	Limited warehousing capabilities and infrastructure	Encourage PPP in storage and warehousing Extend interest subvention schemes to all farmers  Enhance capital subsidy for cold storage and back-end supply chain logistics to reduce losses  Permit banks to classify loans given for construction of godowns under PEG and Grameen Bhandaran Yojana as direct lending to agriculture



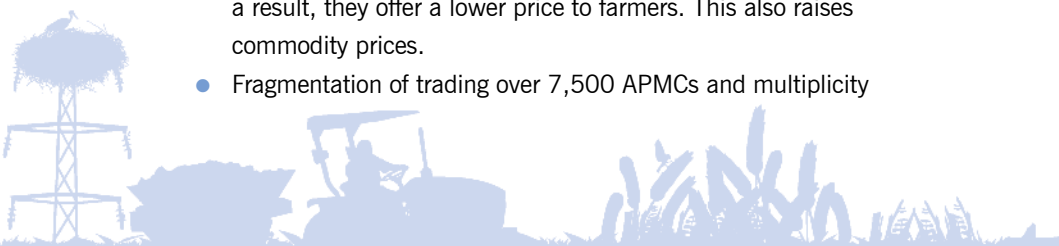
Output side		
Policy agenda	Current issue	Suggestion
Marketing — APMC	The right to sell anywhere and to anyone – whether at home or abroad – is a critical prerequisite	Permitting farmers to sell directly to private buyers beyond market yards; ensuring transparent and simple system of registration of market functionaries; rationalising market related fees, taxes and commission fees to improve the efficiency gains for buyers and sellers; leveraging technology to bring in efficiency in the functioning of markets and developing a national unified market for agricultural commodities
	APMC Act prohibits transactions between farmers and buyers outside the <i>mandi</i> , gives monopoly powers to brokers and middlemen and deprives producers of a just market price. Restricts the relationship between farmers and agri-business enterprises to a transactional mode	

### 8.2.1 National Agricultural Market

There is a need to develop a national unified market for agricultural commodities as per the model detailed below:

#### Extant situation

- Farmers do not get a fair market price because there are too many intermediaries and few buyers at the local level.
- They are forced to sell their produce at non-remunerative prices as they are not able to store their goods in appropriate warehouses or get finance against warehouse receipts.
- Buyers in primary markets borrow funds at steep rates. As a result, they offer a lower price to farmers. This also raises commodity prices.
- Fragmentation of trading over 7,500 APMCs and multiplicity



of fees / levies in each state adds to commodity prices.

- APMC operations are hidden from scrutiny as the *mandi* tax collected by them does not go to the state exchequer.

### Features of a national agricultural market

- Farmers will obtain unfettered access to an integrated, regulated, and transparent pan-India market.
- Farmers will be free to sell in the *mandi* and state of their choice. Buyers will be free to buy from any *mandi*, which will eliminate cartelisation. The commodity will be transported freely to any part of India, which will reduce geographic price disparity.
- All the *mandis* in a state and all the states in the country will be linked to each other through national commodity exchanges / electronic platforms.
- Farmers will benefit from the national market's comprehensive ecosystem, which will include grading, warehousing, agri-finance, crop insurance, warehouse receipt registry, risk management, clearing and settlement, along with direct cheque payment in bank accounts.
- They will get complete visibility of the pricing process through automated auction and post auction facilities (weighing, invoicing, market fee collection, assaying and accounting), and price dissemination through multiple channels.
- Instead of mortgaging their farm or property, farmers will be able to take loans against their crop through warehouse-based sales.
- The creation of a seamless market will attract domestic private capital in the areas of marketing infrastructure and supply-chain logistics.



### 8.3 Agriculture financing

- The latest NSSO 70th round report reveals that in sources of credit, there was high dependence on non-institutional channels. Nearly 40% of loans came from informal sources and 26% were advanced by moneylenders. Marginal landholding households suffer most with only 15% of their credit from institutional sources like government, co-operatives and banks — for households in the highest land class (with land more than 10 hectares) the ratio is 79%.
- In 2003, out of 89.35 million farmer households, 48.6% were reported to be indebted, with the average amount of outstanding loans per household being Rs12,585 at the all-India level. At the time, 57.7% of households had loans outstanding from institutional sources. In 2013, indebtedness in terms of average amount of outstanding

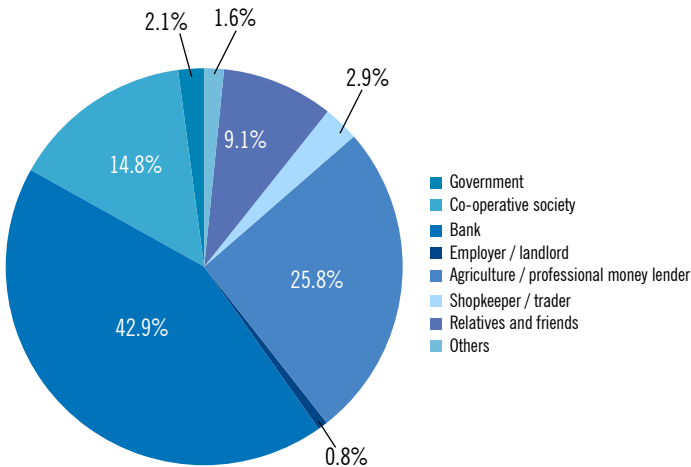


Fig no. C.3. Outstanding loans of agricultural households by sources

Indebtness of farmers	2003	2013
Number of farmers indebted	48.60%	52%
Average amount of outstanding loan (Rs)	12,585	47,000
Loans from institutional sources	57.70%	60%

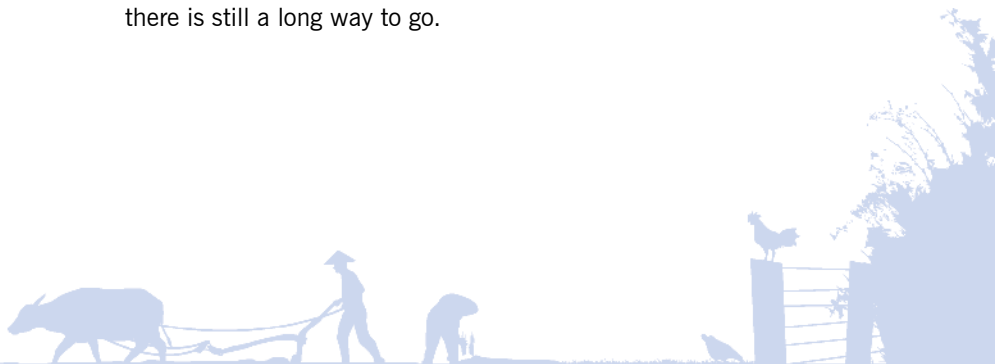
Table no. C. 1. Indebtness of farmers

loan per agricultural household was about Rs47,000, with 52% of the agri-households estimated to be indebted; out of this, 60% were from institutional sources, which is a minuscule improvement in terms of institutional coverage.

### **Impediments to institutional credit flow to the disadvantaged sector**

The constraints in reaching the small and medium farm sector arise primarily out of higher perceived risk, high transaction costs, susceptibility to various types of calamities, higher uncertainty in price realisation and procedural and attitudinal barriers in banks. Administered interest rates that do not cover costs and have no flexibility for discriminating between low- and high-risk borrowers also act as a disincentive to lending.

While institutional lending to farmers has gone up and is continually making efforts to reach marginal and small farmers, there is still a long way to go.

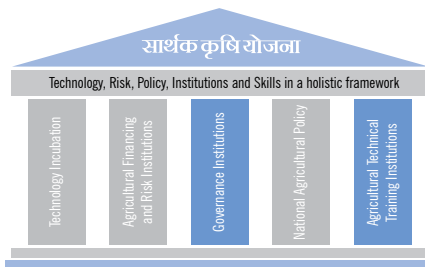


## 9. APPENDIX D:

### Governance Institutions and Agricultural Technical Training Institutions

To ensure the seamless execution and implementation of a national policy and transform India's agriculture sector, it needs (1) to improve human and farm

productivity by introducing modern technology, (2) promote governance institutions such as FPOs, and (3) create awareness about benefits of use of modern technology and (4) train the youth in these technologies, thereby developing skills. In this Appendix we detail out the last two pillars of Sarthak Krishi Yojana:



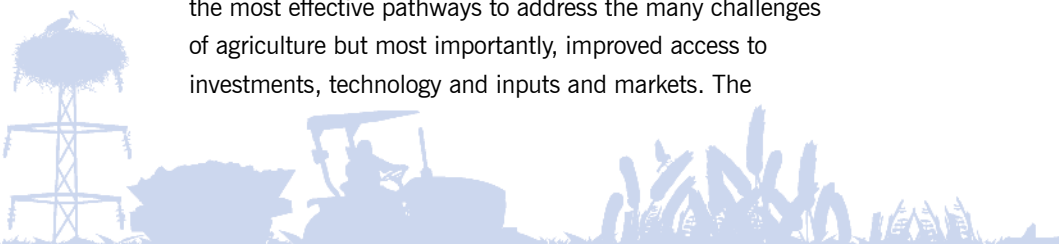
III. Governance Institutions

V. ATIs or Agricultural Technical Training Institutions

#### 9.1 Governance Institutions<sup>7</sup>

*Farmer producers organisations in agriculture should be actively promoted to aggregate farm land, get efficiency, a bit like the Companies' Act*

Collectivisation of producers, especially small and marginal farmers, into producer organisations has emerged as one of the most effective pathways to address the many challenges of agriculture but most importantly, improved access to investments, technology and inputs and markets. The



Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India has identified farmer producer organisations registered under the special provisions of the Companies Act, 1956 as the most appropriate institutional form around which to mobilise farmers and build their capacity to collectively leverage their production and marketing strength. An organisation can be called a farmer producer organisation, if

- It is formed by a group of primary producers.
- It is a registered body and a legal entity.
- Producers are primary shareholders in the organisation.
- It deals with business activities related to the primary produce / product / related inputs.
- It works for the benefit of member producers.
- Portions of profit are shared among producers and the rest goes to the share capital or reserves.
- It has minimum shareholding members of 50 at the time of registration. However, the shareholding membership will have to be increased over three years to a sustainable level.

### 9.1.1 Structure and services of an FPO

Farmer Interest Groups (FIGs) in an aggregated cluster together form FPOs. Typically, around 50-70 FIGs can come together to form a FPO. FPOs can be registered under the Producer Company provision under the Companies Act 1956. However, it must be clarified that the purpose of mobilising farmers is not merely to achieve the target of registering a formal entity. The final form that the FPO assumes (such as co-operative, producer company or multi-state co-operative) must be a decision taken by FIG members at an appropriate time.

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<sup>7</sup>Policy and Process Guidelines for Farmer Producer Organisations



**Resource mobilisation** - Before initiating operations of a FPO all required resources should be mobilised with the help of FPO representatives and the board of directors. Financial, human (staff), technical and physical resources should be developed

**Management systems development** - Guidelines for management systems should be able to address all requirements related to financial services and input and output management services. Systems related to management of finance, human resources, stock and inventory, procurement and quality management, marketing, internal audit, internal conflict resolution and other important functional areas should be developed. Standard operating procedures for these should be established.

**Business operations** - Business operations are the commencement of procurement, production, processing, marketing and financial service activities of a FPO. Careful training both of the governing and operational structures of the FPO is required in order to ensure the smooth functioning of business operations. The value chain related to various agriculture and allied products and commodities needs to be managed.





### 9.1.2 FPO service model

The FPO will offer a variety of services to its members. It can be noted that it offers almost end-to-end services to its members, covering almost all aspects of cultivation (from inputs and technical services to processing and marketing). The FPO will facilitate linkages between farmers, processors, traders and retailers to coordinate supply and demand and to access key business development services such as market information, input supplies and transport services. Based on emerging needs, the FPO will keep adding new services from time to time. The set of services include financial, business and welfare services. An indicative list of services includes:

- **Financial services** - The FPO will provide loans for crops, purchase of tractors, pump sets, construction of wells and laying pipelines.
- **Input supply services** - The FPO will provide low cost and quality inputs to member farmers. It will supply fertilisers, pesticides, seeds, sprayers, pumpsets, accessories and pipelines.
- **Procurement and packaging services** - The FPO will procure agricultural produce from its member farmers; it will do the storage, value addition and packaging.
- **Marketing services** - The FPO will do the direct marketing after procurement of the agricultural produce. This will enable members to save in terms of time, transaction costs, weight losses, distress sales, price fluctuations, transportation and quality maintenance.



- **Insurance services** - The FPO will provide various insurances like crop insurance, electric motor insurance and life insurance.
- **Technical services** - The FPO will promote best practices in farming, maintain marketing information systems, diversify and raise levels of knowledge and skills in agricultural production and post-harvest processing, which adds value to products.

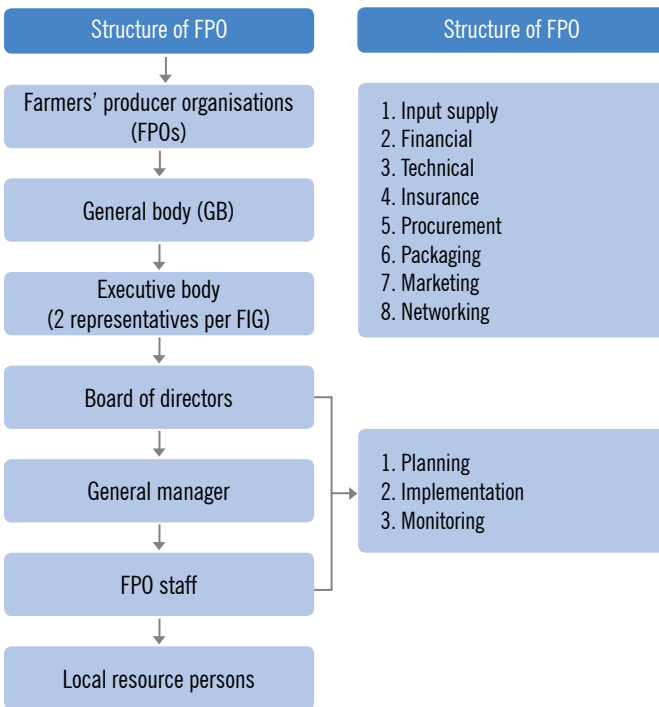


Fig no. D. 1. Service model of FPO



- **Networking services** - Make channels of information (about product specifications, market prices) and other business services accessible to rural producers; facilitate linkages with financial institutions, build linkages of producers, processors, traders and consumers, and facilitate linkages with government programmes.

### **9.1.3 FPOs could play a major role in transforming Indian agriculture**

Traditionally, Indian farmers have gained knowledge and skills by sharing within the community, through government programmes and through the private sector involved in inputs, processing and trade. The collective strength of farmers could enable them to increase their competitiveness through easier access to credit and technology, reducing costs of distribution and providing greater marketing power and negotiation capacity.

FPOs could emerge as one of the most effective pathways to address agricultural challenges. Through adequate policy and infrastructure support these aggregators can become not only the 'connective tissue', linking supply and demand, bridging a major missing link but also become instrumental in faster deployment and acceptance of modern agricultural technologies (including mechanisation). Adoption of modern technologies would result in demand for skilled technicians in agriculture.

- The Ministry of Agriculture has defined a policy and process guidelines for FPOs and,
- NABARD has given special focus and has set up a Producers Organization Development Fund (PODF).



However, there is lack of penetration of the FPO concept among farmers, though the concept had many advantages to transform the economy. Apart from lack of awareness and capability among farmers to operate FPOs, there is a need to synchronise stakeholders, including the state and central governments, officials, bankers, financial institutions, private sector organisations, civil society groups, elected members and others to popularise the FPO concept.

There is another school of thought that suggests that so far the focus of agriculture in India was on producing more, but with FPOs the focus will shift to commercialisation of agriculture and potential unionisation of farmers, which may be inhibiting governments to actively pursue the cause.

Looking at the overall benefits of FPOs, it is imperative to promote and scale up FPOs rapidly in the country to scale up Indian agriculture.

## **9.2 Agricultural Technical Training Institutions**

India needs a technology policy related to soil, water, pest and nutrient management, research in seeds and biotechnology. To ensure that modern methods and technology are deployed effectively, India needs to train rural youth.

*Skill training in 'modern farming' Agricultural Technical Training Institutions (ATTIs), similar to ITIs — imparting training to rural youth in modern agriculture practices and entrepreneurship*



A real entrepreneurial opportunity is available to improve skill development for the food and agricultural sector in the country. There are various public initiatives to improve farm productivity, such as better seeds, agronomic practices, pest / nutrient management and post-harvest technologies. However to upgrade these initiatives, relevant skills and competencies must be strengthened. Efforts have to be made to extend modern farm training and commercial and marketing awareness to benefit the common farmer, as well as develop new agri-education entrepreneurs.

When industry faced such a problem in the 1950s, ITIs were set up. They played a valuable role at the time. Can India now implement an ATTI scheme?

### **9.2.1 Current training initiatives and ATTI overview**

The Indian Council of Agricultural Research (ICAR), under the Ministry of Agriculture, has taken significant strides to impart agriculture education and undertakes planning, development, coordination and quality assurance in higher agricultural education in India. It has also set up 641 Krishi Vigyan Kendras (KVKs) with the mandate to create awareness about agriculture practices and conduct need-based training. KVKs have been functioning as extension services of ICAR.

Most of the training and extension services focus on 'conventional agricultural practices', leading to an incremental improvement in yield, which may not be enough to sustain Indian agriculture. To grow more and generate value Indian



farmers must be encouraged to adopt modern methods in agriculture across the value chain, focusing on:



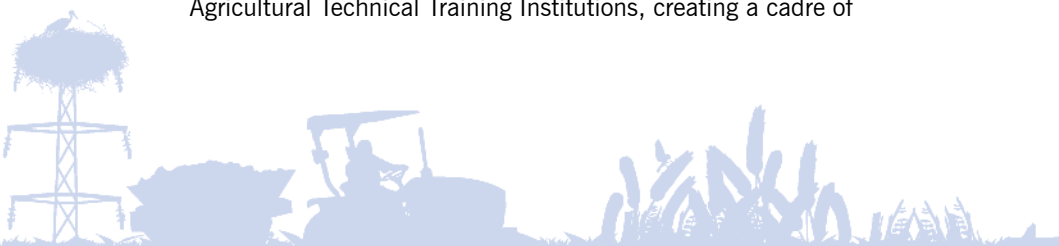
Fig no. D. 2. High level agriculture value chain

- Modern infrastructure — mechanisation, ICT, finance and market linkages
- Modern knowledge regarding agriculture inputs and best practices

Private entrepreneurs can set up state-of-the-art आधुनिक कृषि युक्त संस्था or Agricultural Technical Training Institutions (ATTIs) in rural / semi-urban areas to offer certified courses covering modern agronomy practices, mechanised farming, soil, water and pest management, farm equipment operations, ICT interventions in agriculture, agri trading, marketing and entrepreneurship. The overall objective of skill building should be to:

- Improve the quality of life and farm productivity through modern practices.
- Encourage entrepreneurs to transform skills in food production into a marketing and value-driven business.

Agricultural Technical Training Institutions, creating a cadre of

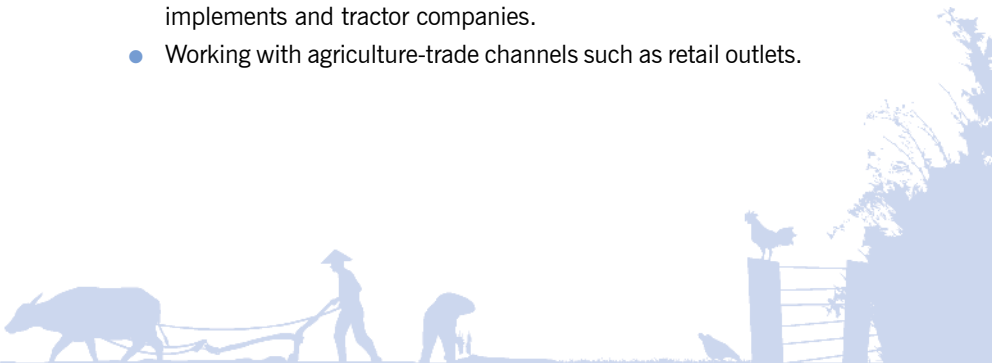


Professional Highly Skilled Agri Technicians (PSATs) and agri entrepreneurs, has the potential to improve employability of rural youth across the agri value chain and eventually help to transform agricultural productivity, and help to convert a village to a town by creating multiple employment opportunities and discouraging migration.

Substantial government participation will be required to encourage entrepreneurs to set up sustainable ATTIs (by partly funding it) and to mobilise the youth towards taking up such courses through scholarships through direct cash transfers. To enable demand for skilled youth in agriculture as well as create awareness of modern practices, the government should encourage the formation of Farmer Producer Organisations.

There could be many employment opportunities for the youth passing out of ATTIs, such as:

- Working with local FPOs, working in government extension services (local employment) to promote agriculture, working in agricultural universities and supporting research projects.
- Working in the private sector, with agri input companies such as companies that produce pesticides, seeds and fertilisers; food processing industry and agriculture implements and tractor companies.
- Working with agriculture-trade channels such as retail outlets.



Food production will receive a boost through dedicated focus on skill building. By means of vocational training, providing adequate direction and stimulus to rural youth in modern agricultural practices and technologies, India can transform the food production and rural landscape, resulting in:

- Skill development in the largest employment sector.
- Creation of rural entrepreneurs.
- Equipping farmers to become traders and marketers.
- Adoption of modern practices, leading to high production and value generation.
- Reduction in urban migration.
- Organisation of farming communities.

This requires a major policy shift, which facilitates direct support to the beneficiary by cutting down the bureaucratic hurdles.





## 10.APPENDIX E: Agriculture statistics

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### 10.1 Summary of agricultural performance

A look at 40 years of key agriculture data showcases how India with almost stagnant net sown area of around 140 million hectares has transformed agricultural productivity.

- As the population of India has grown at about 2% year-on-year from 359 million in 1950 to 1.24 billion in 2014, its food production has followed a similar growth, enabling self sufficiency.
- After the Green Revolution, the consumption of fertilisers and pesticides increased though its average use per hectare is among the lowest in the world.
- The declining trend in pesticide use in agriculture could be mainly attributed to technological developments in pest management.
- As the rural population has grown, the average landholding has been gradually decreasing, resulting in fragmented farm lands.
- The agriculture sector accounts for 55% of national employment, or 263 million people.
- The per capita income in rural India has followed an almost similar growth as urban India — 11.6% in rural per capita income against 12.2% in urban per capita income, over the past 20 years. Still, the disparity between the haves and have-nots exists.



Key agriculture statistics	1970-71	1990-91	2000-01	2010-11	2011-12	Growth rate
Net sown land (million hectares) <sup>8</sup>	141	143	141	142	142	
Population (millions) <sup>9</sup>	548	852	1,029	1,211	1,213	2.0%
Food production (pulses and food grains)(million tonnes) <sup>10</sup>	120	191	208	263	276	2.1%
Average yield (food grains) (quintal / hectare) <sup>11</sup>	9	14	16	19	21	2.2
Fertiliser consumption (million tonnes) <sup>12</sup>	2	13	20	28	28	6.6%
Pesticides consumption (thousand tonnes) <sup>13</sup>	6	72	44	56	53	5.7%
Average size per holding (hectare) <sup>14</sup>	2.3	1.6	1.3	1.2	1.2	-1.6%
Contribution to GDP <sup>15</sup>	42%	30%	22%	14%	14%	

Fig no. E. 1. Summary of agriculture performance

## 10.2 Food production and population growth

CAGR (2000-01 to 2014-15)	Pulses	3.70%
	Food grains	1.93%
	Total production	2.03%
	Population growth	1.40%

<sup>8</sup> Report on Land, Land Use and Operational Holdings – Ministry of Agriculture. For 2011-12 have taken an estimate based on newspaper articles

<sup>9</sup> Ministry of Statistics and Programme Implementation (MOSPI)

<sup>10</sup> Advance estimates of food grains, pulses, oilseeds and other commercial crops by the Directorate of Economics and Statistics

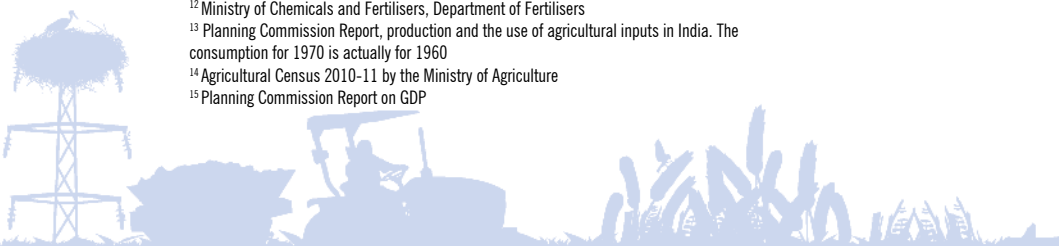
<sup>11</sup> Agricultural Statistics 2013, Ministry of Agriculture

<sup>12</sup> Ministry of Chemicals and Fertilisers, Department of Fertilisers

<sup>13</sup> Planning Commission Report, production and the use of agricultural inputs in India. The consumption for 1970 is actually for 1960

<sup>14</sup> Agricultural Census 2010-11 by the Ministry of Agriculture

<sup>15</sup> Planning Commission Report on GDP



Year	Pulses (million tonnes)	Food grains (million tonnes)	Total production	Increase in production	Total growth rate %
1950-51	8.41	50.82	59.23		
1965-66	9.94	72.35	82.29	23.06	2.2%
1970-71	11.82	108.42	120.24	37.95	7.8%
1995-96	12.31	180.42	192.73	72.49	1.90%
2000-01	11.08	196.81	207.89	142	1.53%
2001-02	13.37	212.85	226.22		8%
2002-03	11.13	174.77	185.90		-22%
2003-04	14.91	213.19	228.10		19%
2004-05	13.13	198.36	211.49		-8%
2005-06	13.39	208.60	221.99		5%
2006-07	14.20	217.28	231.48		4%
2007-08	14.76	230.78	245.54		6%
2008-09	14.57	234.47	249.04		1%
2009-10	14.66	218.11	232.77		-7%
2010-11	18.24	244.49	262.73		11%
2011-12	17.09	259.29	276.38		5%
2012-13	18.34	257.13	275.47		0%
2013-14	19.78	265.57	285.35		3%
2014-15	18.43	257.07	275.50		-4%

Fig no. E. 2. Total food grain and pulses production and their growth rates

	1950-1966	1966-1996	1996-2014
Growth rate of population	2.03%	2.18%	1.51%
Growth rate of production	2.10%	2.97%	1.90%

Fig no. E. 3. Comparison of growth of population and food production



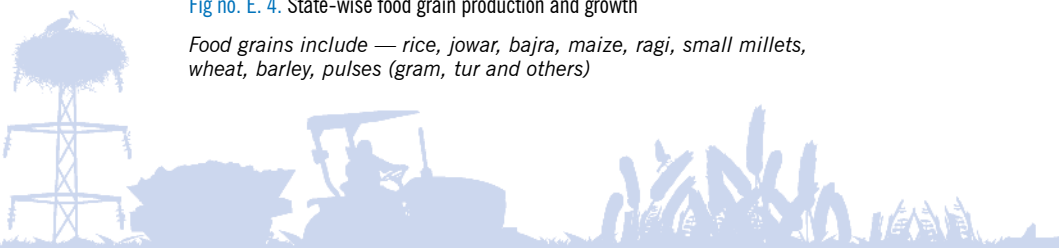
### 10.3 State-wise food grain production and growth

Based on reports from Ministry of Agriculture and the Planning Commission, given below is a list of the top 15 food grain producing states of India. A closer look at the number and respective growth rates reveal that Gujarat and Madhya Pradesh have grown exceptionally, compared with others from 2001-02 to 2013-14.

No	States	Food grain production in 2013-14 ('000 tonnes)	Growth (2001-02 to 2013-14)
1.	Uttar Pradesh	50027.5	1.0%
2.	Punjab	29480.4	1.4%
3.	Madhya Pradesh	22978	4.5%
4.	Andhra Pradesh	19665.1	2.4%
5.	Rajasthan	17899.5	2.1%
6.	West Bengal	17078.9	0.3%
7.	Haryana	16974.1	2.1%
8.	Maharashtra	13846.2	1.8%
9.	Bihar	12905.8	0.8%
10.	Karnataka	12208.9	2.9%
11.	Gujarat	9179.6	5.4%
12.	Tamil Nadu	8783.2	1.1%
13.	Odisha	8359.4	0.8%
14.	Chattisgarh	7595.6	2.3%
15.	Assam	5096.8	2.0%

Fig no. E. 4. State-wise food grain production and growth

Food grains include — rice, jowar, bajra, maize, ragi, small millets, wheat, barley, pulses (gram, tur and others)



## 11.APPENDIX F: Issues in agriculture

### 11.1 Inadequate irrigation<sup>16</sup>

- It may be seen from the chart below that area under irrigation over the past 15 years increased to 50% from 43%. However, it is commendable that in such a scenario, productivity has been increasing and food grain production is showing record levels. There is vast scope for improvement in expansion of irrigation.
- Given that nearly 80% of India's water resources are consumed by irrigation, increased efficiency in the use for irrigation by 20% will have a major impact on the overall availability of water not only for agriculture but also for other sectors of the economy.

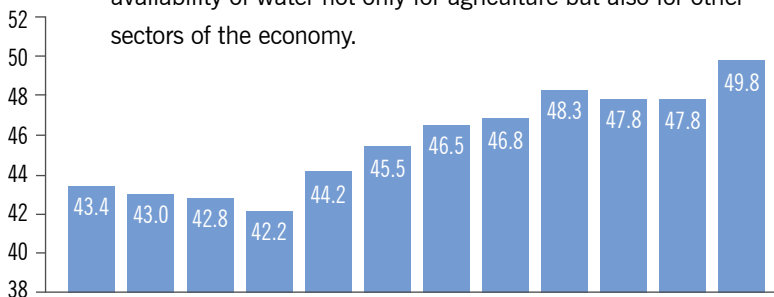


Fig no. F. 1. Irrigation - Not even 50% of net sown area is irrigated

Crop yields on irrigated farms are usually 2-2.5 times those in rain-fed areas. A study completed in late 2011, initiated by the Planning Commission, revealed that the gap between the irrigation potential created and used in large and medium irrigation projects is substantial and growing. Major reasons are low water discharge, insufficient water distribution mechanism,

<sup>16</sup> Reports from Planning Commission and Department of Agriculture and Co-operation



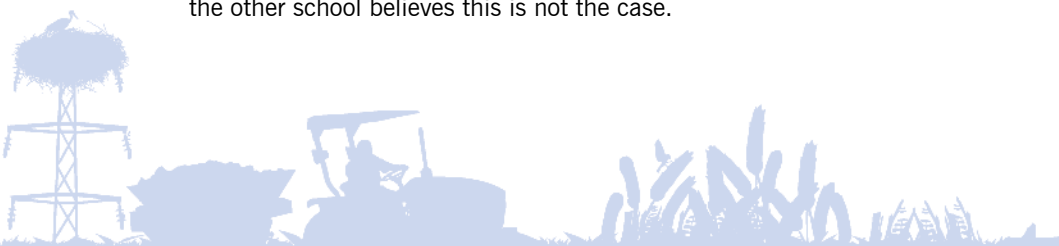
unequal water distribution across farmers at different locations, loss of water during distribution, incorrect recording of irrigated area and diversion of cultivable land to other purposes.

The Eleventh Plan Report of the Working Group 2007-12 emphasised that apart from under-irrigated areas, the excessive exploitation of ground water for irrigation has adversely affected India's water table. Besides, it voiced apprehension that in certain high-productivity regions of the country, irrigated areas are being sacrificed for more profitable non-agricultural activities and for expanding urban geographies. These factors, according to the Working Group Report, are "seriously threatening the efficiency and potential of production supply base of agriculture".

### **11.2 Limitations of fragmented landholding and the impact on productivity and deployment of technology**

We agree that marginal and small farmers face the brunt of challenges of Indian agriculture. But some believe it is due to inadequate irrigation and lack of water. This is also true as irrigated acreage as a percentage of gross cropped area in the past 15 years has largely been the same.

The debate on the efficiency of fragmented landholdings has been going on since Independence. One school of thought believes that fragmented landholdings are detrimental to productivity growth and will not enable use of technology, and the other school believes this is not the case.



To support the latter view, two examples may be cited. Japan and South Korea's average landholding size is 1.2 hectares and 1.0 hectares respectively. But Japan's productivity in paddy and wheat was 6,739 kg/ha and 4,100 kg/ha against the world average of 4,548 kg/ha and 3,090 kg/ha respectively in 2012. South Korea's paddy and wheat productivity was 6,988 kg/ha and 3,910 kg/ha respectively in 2012.

Country	Size of operational holding (hectare)	Paddy yield (kg/ha)	Wheat yield (kg/ha)
Japan	1.2	6,739	4,100
South Korea	1	6,988	3,910
India	1.4	3,721	3,177
World	-	4,548	3,090

Table no. F. 1. Holding v/s yield<sup>17</sup>

However, due to diminishing land availability in the current scenario, it is crucial to improve yields and hence imperative to explore recent trends in leasing of land, farm and land consolidation. In a farm economy such as India's, economies of scale require larger entities to provide critical inputs in technology, infrastructure, marketing and risk management. There are only three ways this can be done: by governments, through co-operation among farmers, or by allowing corporate control.

<sup>17</sup> The Fertiliser Association of India, 2013-14, Agricultural Statistics 2013, Ministry of Agriculture



### 11.3 Need to improve the reach of institutional lending to farmers<sup>18</sup>

While the institutional lending to farmers has gone up and efforts are on to reach the marginal and small farmers, there is still a long way to go.

Agency-wise credit flow to agriculture in India					
(1998-99 to 2012-13)					
(Rs in crore)					
Agency	Cooperative banks	Regional rural banks	Commercial banks*	Other agencies	Total
1998- 99	15,957	2,460	18,443	-	36,860
1999- 00	18,260	3,172	24,733	103	46,268
2000- 01	20,718	4,220	27,807	82	52,827
2001- 02	23,524	4,854	33,587	80	62,045
2002- 03	23,636	6,070	39,774	80	69,560
2003- 04	26,875	7,581	52,441	84	86,981
2004- 05	31,231	12,404	81,481	193	125,309
2005- 06	39,403	15,223	125,477	382	180,485
2006- 07	42,480	20,435	166,485	-	229,400
2007- 08	48,258	25,312	181,088	-	254,658
2008- 09	45,966	26,765	228,951	226	301,908
2009-10	63,497	35,217	285,800	-	384,514
2010-11	78,121	44,293	345,877	-	468,291
2011-12	87,963	54,450	368,616	-	511,029
2012-13 (P)	111,203	63,681	432,491	-	607,375

Table no. F. 2. Credit flow to agriculture in India

<sup>18, 19</sup> NSSO 2013 - 70<sup>th</sup> Report





### 11.4 Impact of Minimum Support Prices (MSP)<sup>19</sup>

MSP initially was started as a safety net for farmers through a guarantee that if their produce is left unsold in the market, it will be bought by the government. Another purpose was to incentivise farmers to produce more crops so as to ensure food security in India.

India faces a complex situation. On one hand there is a record production of cereals and on the other, high inflation even when FCI godowns are overflowing. Many experts opine that India's MSP policy is responsible for this situation. This has resulted in two adverse impacts:

- Growth in agriculture is not dictated by the demand of the economy.
- Persistent inflation.

While MSPs have been going up, the procurement of food grains is only from a few states. For instance, only five (the top five wheat producers) states account for 100% procurement of wheat. Similarly, in the case of paddy, six states account for about 82% of procurement. This is similar in the case of all crops. Generally, procurement is from large-scale farmers. The agriculture policy needs to address how the procurement can be evenly distributed not only among states but also across all classes of farmers.

The latest NSSO survey conducted in 2013 (70th Round) revealed low levels of awareness among households of government procurement operations — at minimum support prices (MSP) — and even lower level of awareness of sale of



these crops to procurement agencies. Only 29% were aware of MSP in 2003; in 2013, it ranged between 2.5% and 39.8% across crops. Only 4% had ever insured their crops and 57% were unaware of crop insurance in 2003. In 2013, across crops, more than 90% of agricultural households had no crop insurance.

Except for sugarcane, less than half the households, which were aware of MSP, sold their crop to agencies. For instance, among households reporting the sale of paddy crop, only 32% were aware of MSP operations and only 13.5% of households actually sold to procurement agencies (in July-December 2012).

### **Criticism of MSP — its effect on the economy**

#### **Distorted production**

Recent trends by NSSO indicate a shift in the pattern of food consumption from cereals to protein-rich foods, but no such remarkable shift is seen in sowing or production patterns. India is the largest producer and consumer of pulses in the world, but 25% of the pulses consumed are imported.

#### **Huge stocks**

This MSP policy has resulted in 'open ended procurement', which means the government cannot decide the quantity it wants to buy. The government has to buy whatever amount the farmers offer. As a result, today, the government has huge stocks that are almost double the requirements for buffer stocks, PDS and other government schemes such as midday meal schemes.



### **Out-of-control inflation**

Initially MSP and procurement prices were kept lower than market prices. So, lower the market prices, lower the MSP and procurement prices. The current situation is that market prices are dictated by MSP, which is most often higher. This brings market prices at least on par with MSP.

Only a third of the cereal production is left for the open market after government procurement and captive consumption by farmers. This creates shortage in the open market and abundance in government godowns.

### **11.5 Excessive use of fertilisers and pesticides**

- Some people express the view that excessive use of pesticides is a cause. The fact is that India has the lowest per capita use of pesticides, even compared to Pakistan, let alone the US or Japan.
- Many have cited that the Indian Green Revolution was one of the greatest success stories in the world with dramatic impact on food security, and was based on the principles of intensive agriculture, which led to newer problems such as excessive use of irrigation water, replacement of rich diversity of traditional crop varieties with a few high-yielding varieties and the inappropriate use of critical inputs such as chemical fertilisers and pesticides. There is a general perception that Indian farmers apply too much fertilisers and pesticides<sup>20</sup>, though the fact is:
  - India's average consumption of fertilisers (~170 kg/ha) is lower than that in Pakistan (~205 kg/ha) and China (~500 kg/ha).



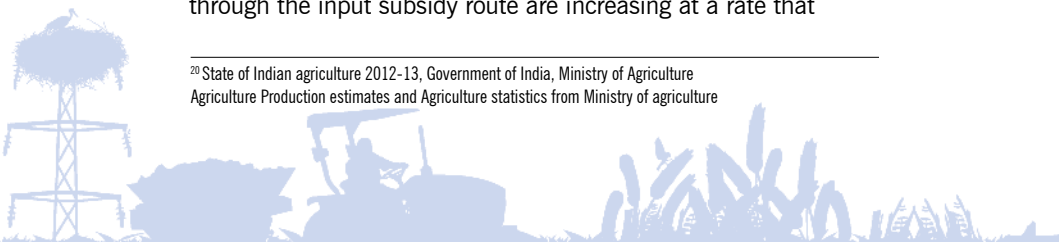
- Agrochemical consumption which is one of the lowest in the world with per hectare consumption of ~0.6 kg compared to US (7kg/ha) and Japan (12 kg/ha).
- China produces 30% more wheat and rice, utilising 25% less land than India.
- Others believe that there is indeed a farm crisis and it is due to soil nutrient imbalance. This is true, but is aggravated by the subsidised fertiliser policy of the government. Urea is still heavily subsidised with the MRP set at just Rs5,360/tonne. With the other inputs, phosphate and potash, deregulated and subject to market forces, the prices of these products are much higher and consequently farmers choose to use urea, distorting the recommended application rates of each nutrient. The FAI has stated that “the lack of reforms in the sector is leading to imbalanced use of plant nutrients and thus affecting the soil health”.
- Others blame GMO seeds. With the exception of cotton, no GMO is allowed in India as of now. Whether this situation is sensible is a matter for debate.

### **11.6 Inadequate subsidies are provided to farmers – should the government focus more on subsidies or investments?**

The overall public resources going to agriculture are in the form of investments and subsidies on inputs like fertilisers, power, irrigation and credit. Public investments are dominated (more than 80%) by major and medium irrigation schemes, which have long gestation lags. The trend reveals that resources going through the input subsidy route are increasing at a rate that

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<sup>20</sup> State of Indian agriculture 2012-13, Government of India, Ministry of Agriculture  
Agriculture Production estimates and Agriculture statistics from Ministry of agriculture



is almost three times faster than the rate of increase of public investment. A study by the top agriculture experts of the country, Fan, Gulati and Thorat, (Source: S Fan, A Gulati and S Thorat, op cit., fn 3.) on the economics of investments and subsidies, shows that marginal returns to public investments are at least 5-10 times higher than through subsidies such as on fertiliser and power.

Returns in growth and poverty reduction to investments and subsidies			
Returns in agricultural GDP (Rs per Rs spending)			
	1970s	1980s	1990s
Roads	19.99	8.89	7.66
Education	14.66	7.58	5.66
Irrigation investment	8	4.71	4.37
Irrigation subsidies	5.22	2.25	2.47
Fertiliser subsidies	1.79	1.94	0.85
Power subsidies	12.06	2.25	1.19
Credit subsidies	18.77	3	4.26
Agricultural R&D	8.65	7.93	9.5

Table no. F. 3. Returns on subsidies v/s investments

### 11.7 There have been success stories — but scaling those is a big challenge

While the macro-economic parameters in agriculture show encouraging trends, there are some micro-economic problems, which are concentrated in particular regions and on particular crops. These problems can be addressed effectively given strong political commitment.



There have been a few success stories, which need to be leveraged.

- **Gujarat's success in agriculture** - Strong political commitment to script Gujarat's success story in agriculture has been through:
  - **Development of strong infrastructure** -
    - ✓ Road construction and maintenance through centrally funded schemes.
    - ✓ Public investment in rural roads and infrastructure.
    - ✓ Sardar Sarovar Project comprises 17 major and 169 medium irrigation schemes.
    - ✓ Construction of check dams, *boribunds* and *khet talavadis*. As of June 2007, 126,000 check dams and *boribunds* were constructed in Saurashtra / Kutch. Also, 71 lakh *khet talavadis* were constructed. The 10,700 check dams built by 2000 helped to drought proof 320,000 hectares; Greater access to water allowed for multi-cropping and growth of high-value F&V.
    - ✓ Jyotigram Scheme - Judicious use of water was made possible through a rural power supply scheme (Jyotigram scheme). A proper charge for the electricity used ensured that ground water was not misused.
  - **Reforms** - Reforms were made in the Model Act 2003 and all amendments to the APMC Act, allowing direct marketing, contract farming and markets in private/co-operative sectors.
  - **Gujarat's agro-industrial policy** - It offers interest subsidies and other incentives for agro-industrial units, setting up agri-supply chain infrastructure and crop / research development institutes.



- **Linkage of government and state institutions** - such as agricultural universities, NGOs / civil society organisations and companies in bridging the knowledge gap — making agricultural technology and know-how available to farmers.
- **The success story of drought-prone Ralegan Siddhi village** - The World Bank Group has concluded that the village of Ralegan Siddhi was transformed from a highly degraded village ecosystem in a semi-arid region of extreme poverty to one of the richest in India. The Ralegan Siddhi example, now 25 years old, demonstrated that it is possible to rebuild natural capital in partnership with the local economy, and is a model for the rest of the country. The village carried out programmes like tree planting, terracing to reduce soil erosion and digging canals to retain rainwater. For energy, the village uses solar power, biogas (some generated from the community toilet) and a windmill. The project is heralded as a sustainable model of a village republic. The village's biggest accomplishment is in its use of non-conventional energy.
- **The success story of six drought-prone villages in Maharashtra** - Thapewadi, Phalakewadi and Muthalane villages in Pune; Randulabad village of Satara; and Satichiwadi and Shelkewadi villages of Ahmednagar are all villages in drought-affected districts of Maharashtra. All six villages lie in the rain shadow area of Maharashtra. However, these six villages are now drinking water secure. How did they achieve this?



The first step was for the villagers to map their water resources. The next step was to answer questions such as how much natural supply of water was available, what are the uses of this water within the village — for drinking, agriculture, domestic needs and livestock — to understand the demand, and given the available supply how quickly would the drinking source dry up.

**Monitoring water year-round** - This meant the villages would check water levels in different sources periodically. If the water level was reducing in a well, then water supply to the villagers would be reduced proportionately.

**Choosing the right crops** - Some crops require more water than others. Depending on the water usage through the year, the villagers understood how much would be available during the second crop season (rabi) and thus chose the crop accordingly.

**Redistributing water use based on supply** - A shortage of water meant that the villagers would save water for the summer by re-evaluating how much water would be used for agriculture and other purposes versus for drinking.

**Installing water meters** - Meters were installed in villagers' homes. This helped them to become conscious about their domestic water usage.





## 12.APPENDIX G: Agriculture policies

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### 12.1 The first phase of agriculture policy – general reforms

During the pre-Green Revolution period, from 1950-51 until 1966-67, Indian agriculture witnessed different policy reforms, such as institutional changes, implementation of irrigation projects, imposition of land ceiling acts, tenancy rights and abolition of intermediary landlordism.

Farmers contended with stagnating agricultural productivity, increasing costs of production and near stagnant prices for most crops. This is a useful starting point for any discussion on addressing the current and future climate vulnerability of these farmers.

### 12.2 The second phase of agriculture policy – the Green Revolution

This phase saw policies dedicated to attaining food security and not relying on food grain imports. The focus was on higher productivity through use of technology, higher input use, assured availability of credit, price support, extension, research and marketing. The government also set up the Food Corporation of India and the Agricultural Prices Commission.

Although there were no major reforms during the 1980s, allied agriculture sectors, such as fisheries, poultry, fruits and vegetables, grew rapidly.

Post 1991, the era of the new world order began with liberalisation, economic reform in Indian industry and in financial



sectors and the setting up of the WTO. The agriculture sector was left out of all this and to counter the threat to the agriculture sector with this new world order, the government decided to announce the National Agriculture Policy (NAP) in July 2000.

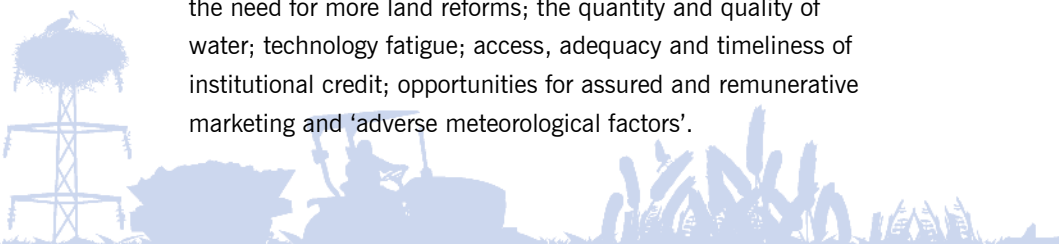
The broad objectives of NAP were:

- To ensure a growth of 4% per annum in agriculture.
- To strengthen rural infrastructure.
- Promote value addition in the agriculture sector.
- Create employment in rural areas.
- Speed up agro business growth.
- Discourage migration from rural to urban areas.
- Ensure a decent standard of living to farmers.

To achieve these objectives, the government introduced a package of policy initiatives, which included sustainable agriculture, food and nutritional security, generation and transfer of technology, inputs management, incentives for agriculture, investments in agriculture, institutional structure, risk management and management reforms.

### **12.3 Setting up the National Commission on Farmers in 2004**

To counter the criticism of the agricultural policy focusing more on increasing agricultural productivity and less on improving the lot of poor farmers, the government set up the National Commission on Farmers in 2004. Its final report in 2006 attributed the dissatisfaction of India's farmer community to the need for more land reforms; the quantity and quality of water; technology fatigue; access, adequacy and timeliness of institutional credit; opportunities for assured and remunerative marketing and 'adverse meteorological factors'.



### 12.4 National Policy for Farmers (NPF) in 2007

Based on the recommendation of the commission, India adopted a National Policy for Farmers in 2007 under the chairmanship of Dr MS Swaminathan, which recognised the need to address the economic well-being of farmers. The main recommendations of the NPF were:

- To increase focus on the economic well-being of the farmer rather than only on production.
- To improve economic viability of farming by substantially increasing the net income of farmers.
- To develop support services including provision for seeds, irrigation, power, machinery and implements, fertilisers and credit at affordable prices and in adequate quantities.
- To strengthen the bio-security of crops, farm animals, fish and forest trees for safeguarding livelihoods and providing income security to farmer families.
- To provide appropriate price and trade policy mechanisms to enhance farmers' incomes.
- To complete the unfinished agenda in land reforms.
- To undertake asset reforms to empower farmers.
- To provide appropriate opportunities for non-farm employment to farmer households.
- To provide suitable risk management measures for adequate, timely compensation to farmers.
- To develop and introduce a social security system for farmers
- To introduce measures to help attract and retain youth in farming.
- To make India a global outsourcing hub in the production and supply of agriculture products and related inputs.

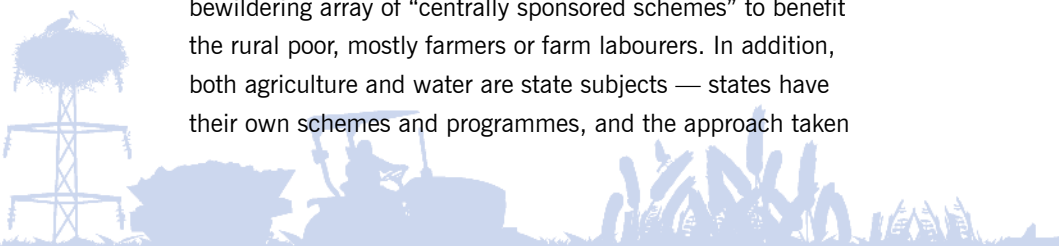


The policy aims to improve farmer income, with an emphasis, among other things, on increased productivity, profitability and institutional support; an improvement of land, water and support services; an improved price policy; and risk management measures. It also aims to increase job opportunities in the farm sector through increased investment in irrigation, watershed development, wasteland development, land and reclamation. Despite the 2007 policy, however, the overall focus and performance of agricultural policy making in India continues to come under criticism from farmer unions for not addressing their concerns. Implementation is clearly a problem — for instance, measures such as bank loan waivers failed to hit their mark, and small and marginal farmers who are most in debt still do not have access to bank loans.

A 2013 survey indicates that barely 27% of small and marginal farmers borrowed from ‘institutional credit systems’ such as rural banks. The rest relied on moneylenders, friends and relatives, often at interest rates higher than 40-60%.

### **12.5 Piecemeal approach**

The Ministry of Agriculture is not the only government agency working to address the concerns of farmers in India. There are a number of other ministries involved — including the Ministry of Water Resources, the Ministry of Rural Development, the Ministry of Environment, Forests and Climate Change, and the Ministry of Panchayati Raj. Each of these ministries fund a bewildering array of “centrally sponsored schemes” to benefit the rural poor, mostly farmers or farm labourers. In addition, both agriculture and water are state subjects — states have their own schemes and programmes, and the approach taken



by each state varies.

The inputs into all these efforts have not necessarily been commensurate with the output, mainly because their conception and implementation has been piecemeal. The efforts have focused on mitigating individual symptoms, instead of promoting a cross-sectoral integrated strategy that addresses livelihoods, poverty, ecological sustainability and long-term food security at the same time.

For instance, the Fourth Five Year Plan (1969-74) initiated Small Farmers Development Agencies, and Marginal Farmers and Agricultural Labour Development Agencies to help small and marginal farmers and landless labour by subsidising small irrigation, land development and soil conservation measures, and livestock acquisition. In 1980, these two programmes were merged into the Integrated Rural Development Programme (IRDP) to help poor rural households to acquire productive (non-land) assets through bank loans and subsidies. Despite its name, IRDP was not sufficiently integrated with other programmes to promote services and infrastructure, and the scale of assistance it provided per household was too small to make a difference.

In 1999, IRDP was replaced by the Swarnajayanti Gram Swarozgar Yojana, which focused on self-employment and micro-enterprise development through self-help groups. It incorporated measures such as infrastructure enhancement, technology support and market linkages that were missing in the IRDP. However, the programme failed to build the capacity of the poor to take up self-employment activities, and to



identify and support economic activities that could be viably run by the poor and integrated with the mainstream economy for sustained viability.

There have also been a number of supplementary wage programmes for rural farm labourers, who do not have gainful employment for a considerable part of the year. These include the 1980 National Rural Employment Programme, the 1983 Employment Assurance Scheme, the 1990 Jawahar Rozgar Yojana, and the 2001 Sampoorna Grameen Rozgar Yojana. These programmes were able to meet only a small part of the demand for supplementary employment, and contributed little to the creation of infrastructure or durable assets. In 2005, wage-employment programmes were transformed into a rights-based programme through the National Rural Employment Guarantee Act (NREGA), which guarantees 100 days of wage employment to every rural household whose adult members are willing to do manual work. NREGA has since emerged as the world's largest job guarantee programme, and has had some success.

In 2010, the National Rural Livelihood Mission was launched, mainly with the goal of livelihood diversification for 'gainful self-employment and wage employment opportunities'. Activities (including promoting self-help groups, improving existing occupations, and skill development and placement) are through decentralised District Rural Development Agencies, which receive the funds directly. A report for the Planning Commission notes that the mission can be a success "if it can overcome the target-oriented and top-down approach generally followed in many centrally sponsored programmes".

