

Add a
paragraph
on handling
of agricultural
waste &
turning to wealth
in the summary part

Revised - recd -

Resubmitted
on 17/8/14
SAM.

[Signature]

Chapter 3

LIBERATING AGRICULTURE

Most Indians in the urban areas and even in many intellectual debates in the media, food availability is taken for granted. Even many persons who were born around the time of our Independence and even later till 1960, when there were severe food shortages and rationing, have forgotten the role of agriculture.

It is India's first Green Revolution in the late ~~19~~ 1960's initiated boldly by the late C. Subramaniam, that changed the picture of food availability. There were no longer any nation wide crises requiring "ship-to-

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mouth" existence.} We depended on
US food shipment to avert serious
crises.

At the time of release of
India 2020 Vision, ~~1998~~ (1998),
the food ~~was~~ availability was no
longer an issue. But those
who produces the food, namely
the farmers and farm workers,
~~were~~ who along with their
families formed about two-thirds
of India's population were all
in
in a very good situation. Rich and
medium ^{size} farmers were well off.
But most others who were a
large majority of farmers about 70%
per cent, were marginal farmers,
owning small plots of lands.

Also the spread of Green Revolution had halted, confining the food graineries of India to Punjab, Haryana, Western U.P and Andhra Pradesh, where the high end agriculture was showing problems of fatigue of soils. Therefore the input costs to get good yields went up.

The Vision 2020 team ~~wh~~ led by the late Prof S. K. Sinha looked at these issues holistically. ~~first and fore~~ Their key recommendations are worth repeating here (reproduced ^{by Kalam and Rajan} from the India 2020 book page 84-85) chapter 4.

(Type the attached 'A' part which ~~is att~~ forms ^{next} page #109. here)

or modified atmosphere to help preserve products, better packaging and so on.

These findings were presented to a high-powered scientific body. It was explained to them that while they may not appear exciting to top scientists, the steps proposed could bring prosperity to millions. The scientists were touched and affirmed that they would have to take an interest in such matters as well.

(It is difficult to capture this vision and action in a few words or one or two catchy slogans. However, to focus on crucial issues, we have attempted to list a few important items below:

- India to aim to be a major player in the world in the agricultural sector and a leading exporter of grains and other agri-products.
- Eastern India to become a major producer of wheat.
- Rice-producing areas to use hybrid seeds on a large scale.
- Central India to be made a centre of vegetables, fruits, pulses and coarse grains.
- More emphasis on tuberous crops.
- Water as a national resource—water management as the key to agricultural prosperity.
- Core post-harvest technologies to be mastered and disseminated.
- Steps to educate farmers about what is happening elsewhere, if need be by providing them the opportunity to travel, and use of space technologies to facilitate interaction and encourage farmers to ask questions and share experiences.

How does one express the vision for agricultural prosperity, describe a vision which uses all the advantages of agro-climate and natural resources, with the use of right and continuous doses of modern technology? The vision naturally includes the fact that for all Indians the availability of food and worrying about where the next meal is coming from will no longer be a prime concern. They will have food in plenty compared to their situation today.

A vision for total production or per capita consumption or

export figures alone does not comprise the totality of what we envisage. The action taken to realize it is just as important. Achieving these projections is not at all impossible. Investments are not difficult. But there is a lot of hard work, synchronization of policies, administrative support and actual field work which includes taking people and farmers into confidence and reaching the benefits of technologies to them that is required.

I have often been questioned by people from diverse walks of life as to the actual realization of the vision. Scientists, technologists, managers or administrators ask, 'In your vision for agriculture, how do we place specific targets? Can we organize a programme like the missile programme?' School and college students ask, 'Sir, can we launch India into agricultural prosperity as you have done for national security with Agni?'

I explain the ideas in different ways. These are addressed in a later chapter. Generally, the answer is on these lines: 'A vision is not a project report or a plan target. It is an articulation of the desired end results in broader terms. For example, a vision for India in the 1980s was to have independent strengths in designing, developing, manufacturing and launching various missiles best suited to our strategic requirements. With the successful launch of SLV-3, with the strengths of DRDO and other potential strengths, such a vision was a realizable one, though difficult when looked at from the perspective of the '80s. But to define individual projects, their interlinkages and the teams required to implement such projects successfully took considerable work from many dedicated persons. Many years were spent in focussing on specific tasks and in defining specific work packages.

'Tasks involved in executing the vision for agriculture and agro-food processing will be equally and in fact more complex. The vision will have to be packaged in a large number of viable, focussed projects. Many of them will be executed by private individuals or groups out of their conviction and risks will be taken by them. A small group of people can be in touch with all of them to make an overall assessment of the direction in

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the page
indicator

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past two years when the industrial & ~~sector~~ manufact sector came close to zero growth, it is the \pm agri-growth that has kept the overall \pm GDP growth at the levels achieved.

We will quickly review some elements of the progress and ^{problems} in the following few paragraphs, before concluding what ~~we~~ we can do in this sector and how soon.

The target of agriculture growth for the eleventh Five Year Plan (~~2008-2011~~) was \pm 4 per cent. Achieved rate 3.5 per cent. As per Vision 2020 estimates, even the targets fixed for 11th Plan is small. In fact we need to

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but more aggressive targets are they are achievable. But recall again the last paragraph of the quote from India 2020, book, reproduced above. We need systematic and synchronised actions. ~~can~~ We will come to that a little later.

Now the achievements in [can be seen in a report] agriculture ~~to per~~ Economic Survey 2012-13: Agriculture does well in output growth" India Infoline Service / Feb 27, 2013. Some quick extracts from the report:

- o Food grain production in India has shown remarkable improvements in recent years. 2011-12 saw the ~~the~~ record high of 259.32 million tonnes.
- o ~~Certified~~ Increased availability of certified quality seeds more than doubles in 2012-13 from 2005-06.

o Live stock sector achieved an average growth rate 4.8 per cent.

o Export of agriculture and allied products during 2011-12 accounts for 9.08% of India's total exports against 6.9% during 2010-11.

One of the important achievements of the ~~recent years~~ during the 11th Plan period is to bring the eastern India ~~into the~~ as a major supplier of cereal to Indian market. And also the fact that vegetables and fruits are getting into ^{the} food of Indians much more.

On the irrigation front, the situation remains, the rate of growth of irrigated lands (about 60% per cent of ~~are~~ agricultural lands are still rain fed - that is depending on monsoon rains) is still very slow. As per the India Brand Equity Foundation (IBEF www.ibef.org)

Report "The Indian Agriculture Sector: Investments, Growth and Prospects" January 2013 "the increase in ~~private~~ the area under irrigation is considerably smaller in comparison to the increase in private and public sector investments". Thus increase ~~ach~~ of production achieved now as ~~given~~ ^{described} above, can be vulnerable to failure of monsoon and/or continued drought periods. That is why, one of the key recommendations of ~~the~~ India 2020 ~~view~~ book, ^{reproduces} ~~given~~ in ~~the~~ earlier page of this chapter ^{to the farmer:} was on availability of water & water management.

// Some readers may look into ~~with~~ the govt budget for irrigation.

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country from the serious food
crises ~~since~~ till the late sixties
and early seventies. Farmer
in these irrigated lands innovated
further bringing India's agricultural
production to a fairly good
shape as we had noted in India 2020
book.

But that is not the
full potential of India. ~~East~~
The other agricultural lands
which are almost the twice
the size of the irrigated areas
need to be enabled with
water availability, through
variety of means of micro- and
minor irrigation system and

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more importantly through
drip and sprinkler irrigation methods,
& extensively provided by public
sources or allow private sector
to do. This has not taken
place. Even while lip sympathy
is given adequately to the
millions of poor ~~and~~ marginal
and small farmers who work
in these unirrigated lands
(nicely described in govt documents
as rain-fed agriculture areas!),
nothing much has been done.
In fact the slower
(than what is possible) growth of

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Indian agriculture has been
because of these struggling "rainfed"
areas of agriculture. ~~As per~~

~~the~~ ~~The Technical Committee~~

TCWP in its report
~~emphasises~~ highlights the
importance of improving productivity
~~gain~~ in rain fed agriculture in
order to meet food security
demands in ~~200~~ 2020. The Committee
has also laid some key reforms
and guidelines. (from
LIBET Jan 2013 ~~reference~~
earlier).

In doing so, not only
will India become food secure
but ^(will be able to) also export. And most

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importantly, all those farmers who ~~had struggled~~ ^{are struggling} with low productive, rain-dependent and therefore risky and uncertain ^{profession} for their livelihood, will be liberated. Unfortunately as it ^{is} happening in the forest sectors in ~~India~~ independent India, many such reports are "dealt with" with a launch of a ^{few} projects or programmes with catchy phrases ^{with} budget allotted but little progress is made on ground. These new watershed projects were supposed to be launched from

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from 1 April 2008! Bills enacted by the Parliament for food security or ~~job~~ employment guarantee etc will be of little use, if there are no actions on the ground to make the Indian soils (arable lands) more productive. If the work done by people is not of high productivity they will generate a very little ~~of~~ wealth; this is the root cause of wide spread poverty in the country.

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We are not going to fill up the pages with many more detailed information about several other facets and therefore indicators of the progress of Indian agriculture. For example, use of chemical fertilisers in India compared to global standards of most developed and emerging countries is ~~low~~ reasonable but low.

Detailed world wide comparisons can be had from the data from ^{the} World Bank, Food and Agricultural Organisation (FAO)

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and many other sources through
a ~~website~~. web search. ^[Information on past] ~~past~~

usage even as early as 1980's

to each year updates are

available. It will be good if

interested readers start looking

at some of these. So also ~~the about~~

the information on

[The use of pesticides in units

of kilogram per hectare ^{is} ~~are~~

available. But ~~these consumption~~ of these
will come to correct levels, if Indian agriculture
grows and water availability is assured.

~~At~~ Until the time

when we wrote India 2020

book, ^{most of} the ~~the~~ websites of Government

of India ~~is~~ full of latest

data on variety of these ~~parameters~~
parameters,

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~~(132)~~

with State ~~wise~~ wise data as well. Therefore we do not give many such tables. We high ^[only] light here "big ticket" items, such as making all the unirrigated ~~lands~~ arable lands from ~~that~~ their current "rainfed" status, to irrigated status. & We have described it in the above. It is a crucial area for policy and actions.

As we have quoted some sources and described discussion the progress made so far, ~~we~~ it is to be concluded that

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that despite more than six decades of talking and the special emphasis ~~on~~ in the India 2020 book in the agriculture section for water

management (which was in a self-sustaining way)

will demonstrated by late

Prof. S. K. Sinha and his team in several parts of India, as Vision 2020

follow up projects and also by several others in India)

the "rain-fed" agricultural lands ~~lands~~ in India are yet to be taken care of. Progress is slow.

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~~At~~ the rate of growth agriculture ^{the} percent GDP is below 4% targeted for the 11th Five Year Plan. It was 2.5 percent earlier! With not-so-good monsoons

forecasted for 2014, it may ^(if we do things as usual!) go down. It is easily possible to reach ~~the~~ ^{sustainable} steady growth of Indian Agriculture GDP by 5%. We will discuss ~~some~~ then ~~in~~ ~~the~~ towards the end of this chapter.

But right now we need to address another big ticket ~~side~~ item for uplifting Indian agriculture. That is about the use of Genetically Modified (GM) ~~seeds~~ seeds or Genetic Engineering (GE) methods for ~~the~~ Indian agriculture.

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However the Task Forces had assessed the benefits of GM for India. It is good to recall what they have said around mid-1990's.

A quote from India 2020 book Chapter 4, p. ~~66~~⁶⁷-69, will place the use of biotechnology &

Q " "

'B' See Xerox ^{marker} copy p. 138

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~~p. 68~~ 'C'

// Since then a number of rapid developments have taken place world wide and in India as well.

Organization (WTO) have implications for the future course of agricultural research and development and other initiatives we may take. These relate to giving market access to other countries in selling their products in India. This will place a demand on quality and efficiency in our own agricultural operations. Limits will be also placed on how much domestic support we can give to our agriculture.

Restrictions in terms of sanitary and phyto-sanitary measures both for import and export of agricultural commodities will be imposed. This means there will be demands that residues of pesticides and chemicals be reduced to the internationally acceptable standards. Suppose we say that we will adopt these standards only for exports and that for our own domestic markets we may relax these conditions. Then our own people, starting with environmental activists, will insist that we should also adopt international standards as otherwise the health of our people will be in danger. Thanks to information technology, the demand for stiffer environmental standards in any one part of the world soon becomes a global issue. Thus, the use of agrochemicals and fertilizers has to often conform to international specifications. There are also other considerations of equal national treatment under the WTO. In other-words, we cannot have one standard for Indian business and another for a foreign entity.

Serious implications arise from various international obligations for the protection of Intellectual Property Rights (IPR). This means far greater commercial restrictions in the use of technologies developed elsewhere in the world. Even our own research cannot be based on mere imitation of foreign technologies. For example, we cannot assume easy availability of better seeds as we had obtained through the Mexican high-yielding varieties at the beginning of our Green Revolution: witness the trend of foreign scientists and technologists attempting to patent an agriculture-related invention—new methods of growing basmati rice—as happened recently in the US.

Now let us go back to table 4.1 which projects possible

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foodgrain imports by a number of countries with huge populations. If a number of them do import, many companies in developed countries will resort to selling foodgrains as a business. (Even now they do, though in ways that are not too obvious.) Once we have to depend on imports to provide food for our people, foreign companies and governments can use this issue politically to derive many trade and political advantages. It is also likely that they will resort to conditionalities which will perpetuate the dependence.

An environmental concern that is likely to have implications for Indian agriculture is the emission of gases like methane and carbon dioxide. These are calculated based on various models. India will be told that we contribute so much and there may be some penalties on those who emit more than an internationally established limit. Some of the concerns could be real but some could be an outcome of complex geopolitical motivations. The latter can assume various forms to mask pressures. In any case we have to learn to make our own models and counter geopolitically-motivated pressures. Further, since climatic changes will affect agriculture, we should also be able to filter out facts of scientific relevance and take advance action to protect our agriculture.

The technologies

In addition to representing the national will and organizing a large-scale national effort, technologies play a crucial role in achieving food security for the country.

We would naturally start with biotechnology as it deals with many aspects of basic inputs to agriculture: seeds, plants, soil treatment, etc. It is crucial to food security, if we take the right steps. One of the most important technologies is that which can lead to transgenic plants; that is, plants which are 'human-made' and are tailored to meet the desired objectives by transfer and expression of the desired type of gene to a target plant. Worldwide, a number of such developments are taking place. In 1994-95, of the total number of 482 transgenic plants

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In an excellent article titled "Global Review of Commercialized Transgenic Crops" in Current Science Vol. 84, No. 3, 10 February 2003, Clive James has described and surveyed the whole ~~sector~~ set of GM crops. It covers briefly the period 1996-2000, ~~and it is~~ as well, beyond the period of 2000 quite. He starts The unprecedented

rapid adoption of transgenic crops ~~during~~ during the initial five year period (1996 to 2000) when genetically modified (GM) crops were first adopted, reflects the significant multiple benefits realized by large and small farmers in industrial and developing countries that have grown transgenic crops commercially. Between 1996 and 2000, a total of fifteen

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Countries — 10 industrial and 5 developing —
contributes to more than ~~25~~ twenty-five
fold increase in the global
area of transgenic crops from
1.7 million hectares in 1996 to
44.2 million hectares in 2000. The
accumulated area of transgenic
crops planned in the five-year
period 1996 to 2000 total 125 million
hectares ^(ha) equivalent to more than
300 million acres."

He further ~~explains~~ informs
that 'adoption rates ~~of~~ for transgenic
crops are unprecedented and are the
highest for any new technologies
for agricultural industry standards.'

This is because of ~~the~~ a variety of
benefits to the users, including

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improves weed and pest control,
~~reduces~~ reduces the expenditure on
~~them~~ such controls and due to
ease of operations. He has listed a
number of other benefits in the article.

~~For the year 2001~~

Let us look at the
current status of the ~~&~~ use
of GM crops, in Nature's
"GM Crops: A Story in Numbers"
<http://www.nature.com/news/specials/gmcrops/index.html>. Of
the total ~~area~~ arable land
world wide which is about 1.5 billion ~~ha~~
hectares (ha), 170 million ha
are under
GM crops, in 28 countries as of 2012.
Most crops are grown in just

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top five countries USA, Brazil, Argentina, Canada and India. The ~~top~~ top five amount to 152 million ha.



Such statistics are available in detail in a number of websites ~~and~~ of FAO and other agencies and we are not repeating them.

Popular crops are Soya Bean, Cotton, Maize, Canola. For Soya Bean about ~~81%~~ 81% of the crops are in GM mode and conventional only 19%. ~~For Cotton~~ For cotton, GM covers 81%, 19% only in conventional. For maize 35% is in GM; 65% conventional. For Canola it is 30% GM; 70% conventional.

The other 23 countries which are in the list are likely

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to accelerate the use of GM
mode, as they have all done
commercial production in a
major way. Please recall the
earlier Chapter 2, from the
Sharad Pawar's interview. In
2003-04 the area under

Bt Cotton (it is GM) was 1.23 per cent
of the total cotton cultivation of 137
lakh bales.

In 2012-13, it is 91% of the
total 352 lakh bales. See the

rate of change of adoption and
more-than-doubling of the yield
(production). So much so India
was importing cotton in 2007 and
now it exports.

So in the coming few
years, there will be ~~major~~ ^{large scale} adoption

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of many more countries in the world. We hope India does not lose its great momentum.

Let us look at one more aspect. In our earlier book we have emphasized rightly the food security aspects. It is most critical for poor and marginal farmers. We would like to share with you ^{results of} a ~~very~~ recent

research study "Genetically Modified Crops and Food Security" by Matim

Qaim and Shahzad Kouser, June 05, 2013

~~(<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0064879>)~~

(PLOS ONE 8(6):e64879 doi:10.1371/journal.pone.0064879). It is based on

a panel survey of Indian cotton farmers

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households in four rounds between 2002 to 2008, in Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu. These four states, as per the researchers cover a wide ~~and~~ variety of different cotton growing situations - GM and conventional. They produce 60% ~~of~~ cotton in the central and south ~~of~~ India. It is exciting to see the details of the survey data they give. For brevity, we quote their conclusion:

"The results of the research confirm that the income gains through Bt Cotton adoption amongst smallholder farm households in India have positive impacts on food security and dietary quality. GM crops are not a

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panacea for the problems of hunger and ~~and~~ malnutrition. Complex

problems require multi-pronged solutions. But the evidence suggests that GM crops can be an important component in a broader food security strategy. So far, food security impacts are still confined to only a few concrete examples.

The nutritional ~~security~~ benefits could further increase with more GM crops and traits becoming available in the future. Appropriate policy and regulatory ~~measures~~ frameworks are required to ensure that the needs of poor farmers

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And consumers, are taken into account and that undesirable social consequences are avoided".

So ~~to~~ it is a good news not only the overall statistics of economics of the country, such as more production and exports, but at also the micro-level of the small households, the increased incomes are leading to better food and nutritional security.

Therefore the country has to learn to take a leadership in GM crops. Our farmers have shown the way through ^{Bt} cotton. They like to have the other items too, will be tested and released through the

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national technical agencies. Unfortunately the activists groups have ~~held~~ held ~~at~~ the progress. The intervention of the courts also appear to be excessive in terms of even trying to stop testing and the necessary ~~the~~ ^{field} trials. The capabilities of Scientific and Technical communities have grown since the 1990's to be able to do rigorous testing and careful monitoring.

Let us not lose this window of opportunity for the farmers and India. Again as pointed out GM mode is not a panacea. It is not in lieu of various other things we have discussed such as full irrigation; use of drip ~~and~~ irrigation; soil conservation etc.

R&D ⁽¹⁵⁰⁾ and

We need to also promote trials of organic farming in some ~~at~~ areas to improve its present low levels of yield (about 25 to 30% of the yield that ~~will be~~ ^{is} obtained ~~from~~ well fert^d with chemical fertilisers and pest ~~and~~ control techniques). In fact, some innovative research may develop GM plants to ~~add to~~ ~~the~~ increase the yield of green material which goes as manure.

Let us end this ~~fa~~ section with a quote from an article "Genetic Edge" in Businessline March 26, 2014 by David Zilberman: "GM varieties provide new means to increase crop productivity and are essential in the transition ~~to~~ to a renewable, bio-based economy. India's strong

Scientific base is likely to make it a leader in this new economy. I hope that ~~the~~ India will take advantage of the opportunities provided by ~~the~~ bio-technology and develop a system that enables the introduction and adoption of GM varieties".

GOVERNANCE IN STRUCTURAL CHANGES TO AGRICULTURE

~~ECONO~~ GOVERNANCE

~~That~~ Now we come to another major item, perhaps the most critical item for liberating Indian agriculture to reach its full potential. Then alone Indian economy will be boosted to next higher ~~level~~ level. This is not to do with a number of physical

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items we have discussed earlier
such as water ^{availability} & diversifying into
new geographic areas, ~~water~~
~~GM~~ improvement of the
supply chains, GM crops etc. But
the one we ~~have~~ have to address
is about the economic reforms
in agriculture.

Most urban ~~elites~~
people including intelligentsia won't
not be aware of high degree
of govt ~~control~~ (state and central)
of control on agriculture. When
a farmer produces more, there is
no guarantee that he can sell
at best price. There won't be
of orders regarding govt procurement,
export control (even outside the
district or state) etc, imposed by

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authorities. All these in the name of controlling inflation etc. On the other hand when the farmer loses a season's crop due to floods or more often due to poor ~~rain~~ or untimely rains, there is no easy way of compensating ~~him~~ him. There are some insurance schemes but the procedure is so complex that ~~that~~ the farmer will ~~to~~ get some compensation only ~~in the~~ after a year. It is not like an automobile insurance!

Moreover, in romanticizing agriculture and farmer, we tend to forget the fact that overall population since ~~The~~ independence has

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It increased ~~by~~ by about five times. Though at the time of independence the workforce dependent on agriculture was about 80%, with the five fold increase it is still about 60%. That is the reason of large scale fragmentation ~~to~~ of land and resultant ~~an~~ increase of marginal farmers.

Cooperatives like Amul have helped the marginal animal husbandary by creating ~~at~~ centrally planned ~~at~~ collection systems at the village level and using high technology infrastructure for treating ~~to~~ liquid milk, packaging and delivery. ~~The~~ ~~is~~ ~~the~~ Such cooperatives

P.T.O

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to take up even a low end service sector job in towns and cities.

Also, agriculture in India is suffering from ~~scarcity~~ lack of investment. Govt cannot invest; if it does it will carry with it lots of bureaucracy, red tape and resultant corruption.

Existing laws are complex and uncertain. For ~~any~~ ^{an} ~~investor~~ investor to ~~be~~ take up large scale large ~~the~~ numbers of marginal lands (on contract basis) for agriculture. Some limited cases are available to look at. It is time that we open up agriculture to a system in which ~~an~~ it ~~investor~~ can work like a corporate entity. An investor or a group of

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investors may ~~take up~~ enter into
a formal legal contract with a
large number of farmers to use
their lands on a lease basis
for specified number of years
say ~~20~~ twenty years or more. In
return the investors pay each
such farmer a fixed ~~licence~~

of lease fee on a monthly
or quarterly basis. ^{Amount will be calculated on the basis of quality of land.} There can
be agreed ~~year~~ annual ~~and~~
increases to the lease amount
based on some of the inflation
indexes. ~~prior~~ In addition, if
the farmer so desires, may
have ~~a~~ upto ~~to~~ certain amount
of stocks, as a promoter.

Also there will be
no bar for the farmer to work

in this new venture (call it a company) to be paid for.

Many of them, may be encouraged to go out of villages also to manufacturing and other sector.

They will still get their lease money in their bank accounts and also returns from the

stocks. Even ~~the~~ farmers with larger lands may lease them to this company.

In this method, if launched well in a few select areas of the country can become a new method for corporatising Indian agriculture

This will enable investments for irrigation, fertilizers and ~~many~~ such newer technologies. They may improve agronomic practices and even switch crops for better earning.

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Some of the ~~pro~~ present subsidies
to fertiliser etc being given to the
farmers should go to ~~the~~ such
companies as well. It is to
be noted that ~~the~~ even countries
like USA, ~~E~~ European Union, ^{Japan} etc
etc subsidise their farmers who
have large holdings. That is to
keep the general food prices down.
These companies may have to
be obligated ^{to give} certain amount of
public procurement to be ~~used~~
^{used for distribution to} ~~given~~ the poor or in emergencies
such as disaster etc. But the govt.
controls on them should be minimal
so that they can maximise
production and their earning which
will in turn go also to the farmers.
In this process, the ~~the~~ ^{ownership}
(P.T.O)

of lands ^{NEW DELHI} still remains with the farmers. There can also be formulae worked out for the farmers who may want to sell of the land to the company, as they may have found good alternatives in the cities. They may still retain their stocks.

~~This~~ The above is only a rough out. a simple outline, ~~to~~ but an important and powerful idea. Experts ~~and~~ farmers ~~and~~ politicians and administrators may need to work out the details. Let us ~~even~~ even experiment different models in different States. Let us not go for bombastic words like New Agri Zones etc. What is required is action on the ground and experience. Such steps will go a long way to

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liberate Indian agriculture. Such models can include even Public Sector Company performing such Contract-farming. Even if cooperatives ~~are~~ reinvent themselves, it is good. Let us begin soon!

NEW ~~ERA~~ ERA OF AGRICULTURAL PROSPERITY

It is time India marches ~~ago~~ ahead away from the passenger train speed of agricultural growth. It is one is happy to note that some States in India (as agriculture is a State subject) have gone away from the 3% type of growth rate. In a recent article with data ~~and~~ ~~on~~ States Ashok Gulati—who is a Chair Professor for Agriculture, ~~is~~ is Indian

Council of Research ~~on~~ ^{NEW DELHI} International Economic Relations (ICRIER)

~~in~~ (Toffee Against The Dole Model

Times of India 24 April 2014) points out

about the ~~achieve~~ rate increases

growth rates of agriculture in Gujarat (9.8%),

Rajasthan (9.6%), Chattisgarh (8.9%),

and Madhya Pradesh (7.4%), Jharkhand (6.9%)

They have all registered an impressive growth rate of almost 7% or higher

over a decade-long period. ~~This~~

It is not necessary that all States of India needs to reach such rates. But

they can all improve substantively depending upon their natural endowments.

The author ends the article "If one could learn only a few lessons from this and get all-India GDP

growth up to 5% which is achievable

~~to~~ provides one ~~take~~ takes some bold policy decisions - India will be

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a different country."

We need expand on this statement any further.

We need to urge the decision makers to act and those who are usually desirous of debating to ~~without~~ stop it for a while and give India a chance for a decade!

To sum up, ~~the~~ some of the critical elements to be attended to and to be fixed as targets goals and targets for action are:

o Make ~~in~~ all rain fed areas in arable lands of India to become irrigated in some ~~to~~ form: micro irrigation, drip or sprinkler etc. All these have to be provided by Govt as it invests on big dams and

• Irrigation canals earlier. If ~~for~~ companies on the modes suggested earlier ~~can~~ are allowed to come up, they may ~~can~~ cover some part investment.

In any case 90% coverage of all arable lands within a decade should be the target.

• As an allied requirement 24x7 availability of quality electric power supply for all agriculture irrigation related activities, should become equally a critical target.

• As an ~~associated~~
• Following from these, there will be a large flow of technologies and innovations into agriculture. Special steps need to be taken by govt agencies through national

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~~with~~ agricultural institutions,
non-governmental organisations
(NGO's), ~~and of~~ other private
sector companies and others, to
help the farmers and farm workers
with necessary new skills. If
we forget such a human resource
~~as~~ re-skilling the gains may be
lower. "Let them learn through
trial and error" is not the
right attitude. Indian industries are
realising their earlier mistakes.

Whenever we attempt to
increase productivity and efficiency
in the use of inputs, we should
remember it is to be done through
skilled workforce, whatever may be
the good equipment, technology
and materials are used in the process.

- Continual improvement of supply chains (inputs and outputs) are vital. Therefore road infrastructure and communication infrastructure to farm areas are vital. They need to be continuously upgraded. Special storages may be required for some agr-products.
- GM varieties should be given an opportunity to be introduced to Indian farmers. There has to be a continual awareness creation. Indian institutions and industries should be encouraged to generate more ~~GM~~ ^{com} commercial level GM varieties out of Indian innovations; this.

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Can give competitive advantage.

Initially for some more years we have to depend upon ~~the~~ the VM varieties developed ~~by~~ by foreign companies ~~to be~~ with local production capabilities.

o Continual research and development may be done by for cleaner and 'greener' agriculture including organic farming, which may emerge several decades later.

o ~~All to~~ In all the above, ~~we~~ in the word agriculture we also include animal husbandry, poultry and fisheries, all of which need to be stepped up. But all these are supplementary with the base of land based - plant based

agriculture. GM varieties won't also help ~~as~~ animal feed and for poultry feed.

- o Special attention needs to be given to growing of pulses. Indians (in fact all of South Asia) has a special ~~&~~ love for ~~that~~ pulses, as we have pointed out in India 2020. We still import a lot.

- o As agriculture becomes more and more technology intensive from seed to agri-implements to chemicals to software which may be used for various monitoring and control systems ~~etc~~ and many other items, it is necessary to India's own Intellectual Property (IP). Such IP ~~Right~~ rights (IPR) may become crucial for competitive edge of the future. While we have now many items produced in India, they are based

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on IPR's of other countries. Let
^{start} us generating commercialisable IPR's
in the country.

o As India becomes competitive
at the world level (for domestic
consumption or for export markets)
there will be competitive pressures
built up on the country's products.
Look at the regulatory pressures
on our pharma industries as
they started becoming successful in
exports and in Indian markets. ~~IPR~~
~~issues~~ ~~are~~ ~~been~~ Similarly there
are many provisions in the
World Trade Organisation (WTO)
such as phytosanitary conditions
that may be involved. This
is where ~~is~~ our national govt.
funder institutions and universities

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and alleges ~~shorts~~ (not just agricultural institutions alone as it is a multidisciplinary world now!) should concentrate to help Indian farmers. Also our policy makers should be alert to protect them in global forums, instead of doing near-crisis operations as we do now.

- Lastly we need to take steps towards corporatise Indian agriculture on the lines suggested above. It is not a or least item. We need to experiment and build institutional frameworks so

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so that Indian agriculture can reach its fullest potentials.

Also many of our talented youth will become a part of agricultural profession, as they are competing for IT jobs now!

Yes ~~Indian~~ with ^{growing fast to} Indian agriculture ~~flying high~~ ^{5% or more} and reaching its full potential,

we will have a different India ~~was~~ within a decade.

Along with agriculture, it can lift other sectors as well.