



ROLE OF AGRICULTURE IN INDIAN ECONOMIC DEVELOPMENT

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Abstracts

Agriculture is financially essential for both developed as well as developing countries. Agriculture is acquiring from progenitors to its people to come. Approximate 60 % of Indian populace is working in Agriculture sector in 2014. At global level, World Trade Organization (WTO) 2012 indicated that on International Trade insights demonstrates that provisions and import of Agriculture item is simply US 1.66 trillion and the share of India in deify is 2.07 % import of agricultural items. India has been enhanced its positioning becoming tenth at all told around. In 2010-11 India's provisions of agriculture item was somewhat 6.9 % in complete provisions yet in one year for 2011-and it expanded to 9.08 which demonstrates an immense development of Agriculture item.

Keywords: Role, Agriculture, Indian, Economic Development

India makes it independent in agriculture pattern (sustenance grains) after the green revolutions which makes it conceivable to provisions agricultural sector. Because of guarantee of agricultural control, India gnaws up finally stable in the agriculture sector. Agricultural is essential for the economic development and besides in bump of the circumstances, that it gives provisions of grains to its populace, employment, likewise noteworthy element for contemporary improvement on the grounds that there different items which utilized as a crude material for enterprises, for example, Sugarcane, Cotton, Oil seeds, Jute so on.

Table 3.1: India's Position at Global Level

S. No.	Position	Commodity Names
1	First at World Level	Pulses, Milk, Jute, Jute – like fibers
2	Second at World Level	Sugarcane, Wheat, Rice, Fruits, Vegetables, Cotton
3	Leading Producer	Livestock, Spices, Plantation crops, Fisheries, Poultry

Sources: Economic Survey of India, 2013

As suggested by Economic Survey of India 2013 – India is as a matter of choice primary in the production of Pulses, Milk, Jute, Jute-like strands, and for Sugarcane, Wheat, Rice, Fruits, Vegetables, Cotton and in the generation of employment in Livestock, flavors, Plantation Crops, Fisheries, Poultry, its status is significant.

Table 3.2: India's Position in World Agriculture (2012)

Item	India	World	India's		Next to
			% Share	Rank	
1. Area (million ha)					
Total area	329	13442	2.4	Seventh	Russian Federation, Canada, USA, China, Brazil, Australia
Land area	297	13009	2.3	Seventh	Russian Federation, China, USA, Canada, Brazil, Australia
Arable land	159	1411	11.3	Second	USA
2. Population* (million)					
Total	1241	6909	18.0	Second	China
Agriculture	661	2617	25.2	Second	China
3. Economically active population *(million)					
Total	491	3282	15.0	Second	China
Agriculture	267	1310	20.4	Second	China
4. Crop production (million t)					
(A): Total Cereals					
Wheat	86	701	12.3	Second	China
Rice (Paddy)	157	722	21.7	Second	China
Total Pulses	17	67	25.5	First	
(B): Oilseed					
Groundnut (in shell)	7	38	18.2	Second	China
Rapeseed	8.1	59.0	13.7	Third	Canada, China
5. Fruits & Vegetables (million t)					
Vegetables & Melons	105	1090	9.6	Second	China
Fruits excluding Melons	74	637	11.6	Second	China
Potatoes	42	373	11.3	Second	China
Onion (dry)	15	86	17.4	Second	China
6. Commercial crops (million t)					
Sugarcane	342	1800	19.0	Second	Brazil
Tea	0.96	4.70	20.6	Third	China, Turkey
Coffee (green)	0.30	8.45	3.6	Seventh	Brazil, Vietnam, Colombia, Indonesia, Ethiopia, Mexico
Jute & allied fibres	1.96	3.58	54.7	First	
Cotton (lint)	8.50	26.14	32.5	Second	China
Tobacco leaves	0.83	7.37	11.3	Third	China, Brazil
7. Livestock (million heads)					
Cattle	210	1430	14.7	Second	Brazil
Buffaloes	111	194	57.3	First	
Camels	0.45	25	1.8	Tenth	Somalia, Sudan, Ethiopia, Niger, Mauritania, Kenya, Mali, Pakistan, Chad
Sheep	74	1078	6.9	Third	China, Australia
Goats	154	910	16.9	Second	China
Chicken	774	19571	4.0	Fifth	China, USA, Indonesia, Brazil
8. Implements (000' numbers)*					
Agricultural Tractors-in-use	3149	29320	10.7	Second	USA
9. Animal Products					
Total Milk (000't)	121847	723143	16.8	First	
Total Eggs (000't)	3378	69103	4.9	Third	China, USA
Total Meat (000't)	6190	295462	2.1	Fifth	China, USA, Brazil, Germany

Note : *Figures for 2007.

Source : *Agricultural Statistics at a Glance, 2014*, Directorate of Economics and Statistics, Ministry of Agriculture Govt. of India (Website: <http://www.dacnet.nic.in/eands>).

Agriculture Role in Indian Gross Domestic Product

It is recognized that share of Agriculture and Allied Sector in Indian GDP (Gross Domestic Product) has been diminishing each year, it was 15.2% for every year in the last five year plan however in 2013-14 it is barely 13.9 percent. In our country, Agriculture is a standout amongst the most notable part in field, Data of censuses 2011 demonstrates that it represents simply about 54.6% for all employment to populace and it is additionally doubtless demonstrating in the provoke of distinct the business information of Census 2001 and Census 2011 that number of cultivators further diminished from 127.3 million in 2001 to 118.7 million in 2011 which is demonstrating the facing of employment problem because of transfer from homestead to non-cultivate work.

Table 3.3: Indian Key Economic Indicators (March, 2017)

Industry	2012-13 *	2013-14 *	2014-15 #	2015-16 @	2016-17(2nd AE)
I. Agriculture	1.5	5.6	-0.3	0.8	4.4
II. Industry	3.4	4.2	6.9	8.2	5.8
Mining & quarrying	-0.6	3.1	14.7	12.3	1.3
Manufacturing	5.9	5.1	7.5	10.6	7.7
Electricity, gas & water supply	2.5	4.0	7.2	5.1	6.6
Construction	0.6	3.0	3.0	2.8	3.1
III. Services	8.3	7.7	9.5	9.8	7.9
Trade, hotels, transport, communication & services related to broadcasting	9.7	6.8	8.6	10.7	7.3
Financial Services, real estate & professional services	9.7	11.0	11.1	10.8	6.5
Public administration, defence and other services	4.3	3.8	8.1	6.9	11.2
GVA at basic prices	5.4	6.2	6.9	7.8	6.7
*: Third Revised Estimates ; #:Second Revised Estimates; @: First Revised Estimate; AE: Advance Estimates					

Source: Central Statistics Office.

Table 3.4: Agriculture Production

Crop	Season	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (4th AE)	2016-17 (2 nd AE)
Food grain Production (in million tonnes)									
Rice	Kharif	75.92	80.65	92.78	92.37	91.5	91.39	91.41	96.02
	Total	89.09	95.98	105.3	105.24	106.65	105.48	104.41	108.86
Wheat	Rabi	80.8	86.87	94.88	93.51	95.85	86.53	92.29	96.64
Coarse Cereals	Kharif	23.83	33.37	32.44	29.79	31.2	30.94	28.15	32.77
	Total	33.55	43.4	42.01	40.04	43.29	42.86	38.52	44.34
Cereals	Kharif	99.75	113.73	125.22	122.16	122.7	122.34	119.56	128.79
	Total	203.45	226.25	242.2	238.79	245.79	234.87	235.22	249.84
Tur	Kharif	2.46	2.86	2.65	3.02	3.17	2.81	2.56	4.23
Gram	Rabi	7.48	8.22	7.7	8.83	9.53	7.33	7.06	9.12
Urad	Kharif	0.81	1.4	1.23	1.43	1.15	1.28	1.25	2.11
	Total	1.23	1.76	1.77	1.9	1.7	1.96	1.95	2.89
Moong	Kharif	0.44	1.53	1.24	0.79	0.96	0.87	1.00	1.51
	Total	0.69	1.8	1.63	1.19	1.61	1.5	1.59	2.13
Total Pulses	Kharif	4.2	7.12	6.06	5.91	8.99	5.73	5.53	8.72
	Total	14.66	18.24	17.09	18.34	19.25	17.15	16.35	22.14
Total Foodgrains	Kharif	103.95	120.85	131.27	128.07	128.69	128.06	125.09	137.51
	Total	218.11	244.49	259.29	257.13	265.04	252.02	251.57	271.98
Production of Oilseeds and other commercial crops (in lakh tonnes)/lakh bales									
Groundnut	Kharif	38.52	66.43	51.27	31.87	80.58	59.3	53.68	70.54
	Rabi	15.76	16.22	18.37	15.08	16.56	14.71	13.66	14.18
	Total	54.29	82.65	69.64	46.95	97.14	74.02	67.33	84.72
Castorseed	Kharif	10.09	13.5	22.95	19.64	17.27	18.7	17.52	17.38
Sesamum	Kharif	5.88	8.93	8.1	6.85	7.15	8.28	8.50	8.21
Nigerseed	Kharif	1	1.08	0.98	1.02	0.98	0.76	0.74	0.85
Rapeseed & Mustard	Rabi	66.08	81.79	66.04	80.29	78.77	62.82	67.97	79.12
Linseed	Rabi	1.54	1.47	1.52	1.49	1.41	1.55	1.25	1.42
Safflower	Rabi	1.79	1.5	1.45	1.09	1.13	0.9	0.53	0.59
Sunflower	Kharif	2.14	1.92	1.47	1.87	1.54	1.11	0.66	0.87
	Rabi	6.36	4.59	3.69	3.57	3.5	3.23	2.30	1.54
	Total	8.51	6.51	5.17	5.44	5.04	4.34	2.96	2.41
Soyabean	Kharif	99.65	127.36	122.14	146.66	118.61	103.74	85.70	141.25
Total Nine Oilseeds	Total	248.82	324.79	297.99	309.43	327.49	275.11	252.51	335.96
Cotton #	Total	240.22	330	352	342.2	359.02	348.05	300.05	325.07
Jute ##	Total	112.3	100.09	107.36	103.4	110.83	106.18	99.40	96.21
Mesta ##	Total	5.87	6.11	6.63	5.9	6.07	5.08	5.83	4.43
Jute & Mesta ##	Total	118.17	106.2	113.99	109.3	116.9	111.26	105.24	100.63
Sugarcane (Cane)	Total	2923.02	3423.82	3610.37	3412	3521.42	3623.33	3484.48	3099.84

Lakh bales of 170 kgs. each ## Lakh bales of 180 kgs. each, A.E.: Advance Estimates
Source: Directorate of Economics and Statistics, Department of Agriculture & Co-operation

The evidence from the last decade demonstrates that the Indian agriculture is facing a negative growth rate.

In India, State government are principally work for the agricultural development and their imperative obligation is to develop profitability, to expand capability of agriculture sector, to recover the work and generate employment. To satisfy all these announce, local government helps in this sector non-fiscally and fiscally guides the sponsorship for the improvement and development of agriculture. Local government also supports through divergent projects and furthermore helps through different plans.

There are some prominent products of Agriculture, for example, Rice, Wheat, Coarse Cereals (in million tons) showed in the table indicates development of the simultaneously ware for 1950-51 to 2012-13.

Rice production demonstrates that in 1950-51 it was 20.58 million tons which grew in consistently 34.58 million tons in 1960-61, 42.22 million tons in 1970-71, 53.63 million tons in 1980-81, 74.29 million tons in 1990-91, 84.98 million tons in 2000-01, 95.98 million tons in 2010-11, 105.30 million tons in 2011-12 and 104.40 million tons in 2012-13. Wheat also represent significant development in its production as it was somewhat 6.46 million tons in 1950-51, 23.83 million tons in 1970-71, 69.68 million tons 2000-01, 86.87 million tons in 2010-11 and 92.46 million tons in 2012-13. If there should turn out an outcome of Total provisions, grains production demonstrates that onset was 50.83 million tons in 1950-51, 82.02 million tons in 1960-61 and it expanded colossally in t 1970-71 up to 108.42 million tons, 129.59 million tons in 1980-81, 176.39 million tons in 1990-91, 196.81 million tons in 2000-01 conclusively it increased specifically appropriate 244.49 million tons in 2010-11, 259.29 million tons in 2011-12, 255.36 million tons in 2012-13.

International Trade in Agriculture Sector in India

Representatives of Swadeshi Jagaran Manch were present at the meeting of WTO and discussed Protecting Livelihoods and Ensuring Food Security, sorted out by the Forum for Biotechnology and Food Security and the United Nations Conference on Trade and Development (UNCTAD) in New Delhi in 17 June 2008. There, around 30 agriculturists' pioneers from the nation met to talk about India's agricultural agreements. This letter of determination was later submitted to Prime Minister Manmohan Singh, UPA chairperson

Sonia Gandhi and the opposition leader Lal Krishan Advani, before WTO Ministerial Conference scheduled to be held in Geneva. It expressed that India ought to leave WTO and ought not give up the job of 800 million persons in the sector.

Table 3.5: Production and use of Agricultural Inputs in Country

Programme (1)	Unit (2)	2000-01 (3)	2010-11 (4)	2011-12 (5)	2012-13 (6)	2013-14 (7)	2014-15 (8)
1. Seeds							
(i) Production of Breeder Seeds	Thousand qtls.	42.69	118.85	123.38	110.20	82.29	86.21
(ii) Production of Foundation Seeds	Lakh qtls.	5.91	18.06	22.36	16.17	17.43	15.76
(iii) Distribution of Certified/ Quality Seeds	Lakh qtls.	86.27	277.34	294.85	313.44	301.39	303.12
2. Consumption of Chemical Fertilisers							
Nitrogenous (N)	Lakh Tonnes	109.20	165.58	173.00	168.21	167.50	169.46
Phosphatic(P)	Lakh Tonnes	42.15	80.50	79.14	66.53	56.33	60.98
Potassic(K)	Lakh Tonnes	15.67	35.14	25.76	20.62	20.99	25.32
Total (N+P+K)	Lakh Tonnes	167.02	281.22	277.90	255.36	244.82	255.76
Per Hectare **	Kgs.	89.63	142.34	142.05	131.36	125.39	128.08
3. Consumption of Pesticides							
(Technical Grade Material)	Thousand Tonnes	43.58	55.54	52.98	45.62	60.28	57.35*
4. Area Covered Under Soil Conservation (Cumulative)	Lakh Hectares	4.36	7.49	4.72	5.46	5.46	

Sources: Department of Agriculture, Cooperation & Farmers Welfare.

* updated on 14.05.2015

** Based on Gross Cropped Area upto 2012-13 and for 2013-14 and 2014-15, GCA is estimated in Zonal Conference.

Agricultural Imports to Total National Imports in value for the year 1990-91 was 2.79 for individually which grew up to 5.29, and in 2010-11 it condensed up to 3.41 and in 2011-12 it was 3.53 and for the year 2012-13 it was 4.09.

Agricultural Exports for the year 1990-91 was 6012.76 Crores which increased to 28657.37 Crores, and in 2010-11 it expanded up to 117483.61 Crores and in 2011-12 it was 187609.33 Crores and in 2012-13 it was 230141.13 Crores. Total of National Exports for the year 1990-91 was 32527.28 Crores which grew up to 201356.45 Crores, and in 2010-11 it expanded up to 1142921.92 Crores and in 2011-12 it was 1465959.39 Crores and according to information for the year 2012-13 it was 1634672.95 Crores. Agriculture Exports to Total National Exports in worth for the year 1990-91 was 18.49 for aside which condensed up to 14.23, and in 2010-11 it decreased up to 10.28 and in 2011-12 it was 12.8 and for the year 2012-13 it was 14.1.

THREE YEAR EXPORT STATEMENT OF PRINCIPAL PRODUCTS

Table 3.6: India's Imports and Exports of Agricultural Commodities

	2013-14		2014-15		2015-16	
Product	Qty	Value	Qty	Value	Qty	Value
FLORICULTURE						
Fruits / Vegetable Seeds	19338.58	41657.77	12499.25	42703.38	10684.30	48502.86
Floriculture	0.00	45590.44	0.00	46076.09	0.00	47776.32
Total	19338.58	87248.21	12499.25	88779.47	10684.3	96279.18
FRESH FRUITS & VEGETABLES						
Fresh Vegetables	2291751.00	538447.38	2019342.00	461164.03	1872021.00	476262.11
Fresh Fruits	525224.00	364562.18	484373.00	314807.78	573204.00	391841.14
Total	2816975	903009.56	2503715	775971.81	2445225	868103.25
PROCESSED FRUITS AND VEGETABLES						
Pulses	345553.00	174881.10	222104.00	121810.13	255602.00	165544.31
Processed Vegetables	0.00	128885.64	0.00	172533.90	0.00	169637.60
Processed Fruits & Juices	0.00	333205.01	0.00	362568.02	0.00	376056.64
Total	345553	636971.75	222104	656912.05	255602	711238.55
ANIMAL PRODUCTS						
Sheep/Goat Meat	22608.00	69411.53	23614.00	82811.34	21952.00	83775.61
Other Meat	268.00	340.13	248.00	247.75	0.00	0.37
Dairy	0.00	440777.93	0.00	216168.25	0.00	168151.32

Products						
Processed Meat	508.00	767.82	405.00	1419.71	282.00	618.53
Buffalo Meat	1365643.00	2645781.59	1475540.00	2928258.19	1314161.00	2668155.39
Animal Casings	352.20	2845.84	260.15	1933.25	206.36	1702.45
Poultry	0.00	56680.08	0.00	65119.60	0.00	76671.13

Products						
Total	1389379.2	3216604.92	1500067.15	3295958.09	1336601.36	2999074.8

OTHER PROCESSED FOODS

Guargum	601971.00	1173539.22	665233.00	947990.69	365097.00	361297.00
Groundnut	509751.00	318765.52	708395.00	467537.76	536929.00	403939.28
Cereal Preparations	319554.00	285626.27	306133.00	303323.81	313430.00	331224.35
Milled Products	419263.76	100800.48	415712.55	101851.77	415015.65	107537.62
Alcoholic Beverages	0.00	242967.08	0.00	226226.39	0.00	202718.64
Misc Processed Items	0.00	253148.35	0.00	279597.24	0.00	289778.83
Cocoa Products	16229.24	57321.74	20883.80	84885.36	32210.11	126036.51
Total	1866769	2432168.66	2116357.35	2411413.02	1662681.76	1822532.23

CEREALS

Basmati Rice	3754102.00	2929182.16	3702284.00	2759871.39	4044833.00	2271436.72
Wheat	5572025.00	927765.04	2914743.00	497461.30	614096.00	97232.53
Other Cereals	4637536.00	717814.43	3510554.00	525841.16	908611.00	158891.69
Non-	7148472.00	1779521.10	8225564.00	2033600.47	6374364.00	1508594.02

Basmati Rice						
Total	21112135	6354282.73	18353145	5816774.32	11941904	4036154.96
Grand Total	27550149.78	13630285.83	24707887.75	13045808.76	17652698.42	10533382.97

Source: DGCIS Annual Data (Value in Rs. Lacs Qty in MT.)

<http://agriexchange.apeda.gov.in/indexp/18headproduct.aspx>

Table 3.7: India's Export of Agricultural Products (Qty In MT Value in US)

Product: Wheat Year 2015-16

Importing Countries	Qty	US
Bangladesh Pr	340552.00	82958386.00
Nepal	115118.00	27255948.00
U Arab Emts	99722.00	24836691.00
Taiwan	14591.00	3550028.00
Philippines	7099.00	1922580.00
Top 5 Total	577082.00	140523633.00
Other Countries	37014.00	10070147.00
Total	614096.00	150593780.00
% Share of Top 5 Countries	93.97	93.31

Product: Basmati Rice

Importing Countries	Qty	US
Saudi Arab	948845.00	842215136.00
Iran	695311.00	571188550.00
U Arab Emts	612152.00	475181693.00
Iraq	418312.00	340974307.00
Kuwait	180730.00	211678095.00
Top 5 Total	2855350.00	2441237781.00
Other Countries	1189483.00	1036110760.00
Total	4044833.00	3477348541.00
% Share of Top 5 Countries	70.59	70.20

Product: Pulses

Importing Countries	Qty	US
Pakistan	77538.00	62985917.00
Algeria	32900.00	34897769.00
Sri Lanka Dsr	32649.00	29457319.00
Turkey	18628.00	17936297.00
U S A	9070.00	15564030.00
Top 5 Total	170785.00	160841332.00
Other Countries	84817.00	91183211.00
Total	255602.00	252024543.00
% Share of Top 5 Countries	66.82	63.82

Source: <http://agriexchange.apeda.gov.in/IntTrade/TopDestinationAgri.aspx>

RECOMMENDATIONS FOR INDIAN AGRICULTURE POLICY

WTO is accepting the most important issue of liberality, as it is influencing the Indian economy and agriculture which will do the more impacts in the times to come. A noteworthy concern in effects of WTO is, regarding how the little also, marginal farmers constitute the Indian Agriculture, depend primarily on agricultural for their living, have little surplus and work under substantial requirements to be focused in agricultural development scheme trade related administration. The worry all the more regularly swings to the opposite side that the spreading limb of WTO with reduced tax administration and expanded access to Indian market could severally harm the agriculture based employment. The test to this approach is the manner by which to secure Indian Agriculture from the looming WTO danger that, improve the aggressiveness of Indian farming and make cultivating a reasonable and self-maintaining undertaking to enhance and guarantee employment security of the farmers. A technique to address this test should fundamentally include re-introduction what's more, infusion of market connected dynamism in Indian agricultural R&D, reinforcing of steady establishments to serve the asset for poor agriculturists, and controlling the change with strategies changes. The considerations of the workshop proposed the accompanying strategy activities and activity focuses: India needs to devise fitting domestic arrangement (broad local market changes, substantial interest in building infrastructure and looking after framework, and so forth.) to progress proficiency and intensity and scope of domestic production. It ought to keep on staying on influential position in the process of concurrences with sound scientific premise and support of other developing nations with comparative intrigue. A committed of around 100 specialists, on full time premise, ought to deal with the WTO issues to give investigative premise to arrangement and to help in planning appropriate techniques to promote Indian agriculture to confront increasing trade and globalization.

_ Export of the items like cultivation items, prepared items, marine items and rice ought to be promoted.

_ India needs to counter the difficulties in the fare of conventional things from the developing nations. In such manner, prioritization, upgrading and introduced creation and handling productivity, promoting the transport foundation, looking for quality improvement need to be considered with immediate effect.

_ There is a need to go entire hoard in changing domestic advertise as has been activated by China. The requirements of assortment of laws in agriculture promotion, preparation, capacity, transport should be instantly routed to give logistic benefits, reduction in exchange costs and draw in private interests in post administration. Encourage, requirement of Model APMC Act which energizes coordinated promoting and contract related to farming ought to be actualized in actual..

_ There should to be consistent request for diminishment in domestic sponsorships in case of the developing nations. The developing nations ought to set up a brought together way to deal with guaranteed substantive reduction.

_ All nations ought to indicate their quality prerequisites of agriculture produce on the WTO site.

_ There is a requirement to evaluate the needs of our national ventures including the R&D programs, and to create and keep up the nature of foundation. There should be strict control on the national ventures to guarantee anticipated yield according to the time plan.

_ Since IPR is turning into a critical arena, a plan of IPR, its insurance, upkeep, assessment, treatment of IPR encroachments, and so forth must get need consideration at the Central, State and institutional levels. As far as SPS issues are concerned, India ought to request sensible inner/long time allotment to other nation's new SPS measures, audit of assention at periodical basis, giving specialized and financial help to set up SPS testing/ confirmation systems, accurately characterizing the identicalness, limit working for creating skill in the zone, and so on.

_ A strategy is required to make mindfulness for acknowledging quality perspectives of domestic produces among the cultivating group, merchants, purchasers and exporters. India needs to gain from the experience of other developing nations like Thailand and Malaysia.

_ The Center should counsel states and get their support for trading, WTO plan, and so forth.

_ There is need to set up Export Processing Zones and Commodity Boards for smooth functioning.

_ Agriculture should be in the Concurrent list of the Constitution.

— There ought to be a merger of related sectors like water system, manure, agriculture, and so forth for better coordination and collaboration.

— Public interest in Agriculture must be raised, especially in R&D so that future can be safeguarded.

— The framework related endeavors towards re-introduction of R&D will incorporate general ban on new establishments, advancement of human resources through quality agriculture guidance, coordination of all departmental endeavors, saddling ICT for provincial advancement, sufficient subsidizing of research projects, extend based subsidizing/planning, thorough observing and effect appraisal, fortifying sociological aptitudes, advancing and motivating private sector partnership, building initiative abilities, changes in finance and administration with full decentralization, fortifying plan investigation and vision-situated showcase drove insight investigation abilities, reinforcing agri-business improvement and IPR administration, and crusading for better consideration and consistence in regard of deliver quality by the farmers, merchants, exporters, shippers and the general public.

— The program related efforts towards re-introduction of the R&D system will incorporate needs regarding products especially high value items, reinforcing essential vital and expectant research at ICAR and downstream research at SAUs where 4/5 of the researchers of NARS work, agro-natural targets and working as opposed to national targets and working by the R&D framework, gainfulness other than profitability as pointer of achievement, connecting generation with handling, advertising and utilization with concentrate on poor and marginal farmers and domestic laborers, foundation of value testing/referral labs, inquiry about on negligible non-sustainable characteristic asset utilities, which must join significant returns, high protein content and different qualities requested by the other nations, for example, opportunity from current WTO Negotiations and Domestic Farm Subsidy in India had no particular aggregate AMS reduction in duties. India's notices submitted to WTO demonstrate that India's item specific support is negative also; its non-item particular support is well underneath the 'de minimis' level. India's item particular support is negative since India's Market Support Prices (MSP) for most items was underneath the outside reference value (ERP) for the concerned periods. Also, India does not give any item particular bolster other than market value bolster.

From India's first implementation of WTO about domestic endowments (archive number G/AG/N/IND1 dated 17 June 1998), it can be seen that in 1995-96, India had showed value bolster programs for 22 items. Among these 22, 19 were accounted for in the record. Among the items revealed in the archive, just sugar stick had a bolster cost higher than the ERP. For the various items, the MSPs were lower than the comparing ERPs and

thus India's aggregate product specific support was negative. India's second and most recent adoption is about domestic sponsorships, notwithstanding, reports reduced number of items under the MSP conspire¹⁰. The items detailed in these tables are rice, wheat and coarse grains (bajra, jowar, maize and grain). The supporting tables developing in G/AG/N/IND2 demonstrate

that every one of these items had bring down MSPs than ERPs for both years. As an outcome, India's add up to item particular backings were negative for both the years. India's non item particular bolster demonstrates some fascinating changes throughout the years. For the year 1995-96, India's non-item particular appropriations were in compost appropriation, credit endowment, sponsorship, water system appropriation and endowment by large supply of seeds. These appropriations added up to about US 5,722 million, which was around 7.52 for every of the comparing all out estimation of Indian agricultural creation. This was underneath the 'de minimis' level of 10 percent took into account for developing nations. Subsidies given under Special and Differential Arrangement (Article 6.2 of AoA) added up to just US 254.3 million. Be that as it may, for the showcasing years 1996-97 and 1997-98, there were some discernible changes in the way India plan its non-item particular sponsorships and appropriations given under the S&D Arrangement in AoA. Utilizing the S&D Arrangement of Article 6.235 of AoA, India put a huge share of its non-item particular subsidies under the heads 'speculation endowments for the most part accessible to agriculture' and 'agricultural info appropriations to low pay or asset poor makers'. The way this characterization changed India's non-item particular support can be comprehended

INDIA'S NON PRODUCT SPECIFIC SUPPORT AND SUPPORT UNDER THE S&D ARRANGEMENT

It is remarkable from the table that once growing rate of India's non-item particular bolster has been moved under the S&D class, India's total non-item particular appropriation turns out to be fairly insignificant. India does not have any Blue Box installments but rather India has informed Green Box appropriations. Green Box appropriations were around US 2,502 million in 1996-97 and US 2,873 million in 1997-

98. Among the Green Box endowments a high rate (68 percent in 1996-97 and 70 percent in 1997-98) of endowments went into open stock holding for sustenance security purposes. This discourse demonstrates that India does not have any AMS or Blue Box bolster. India's current local appropriation levels are well below the admissible 'de minimis' classification both in item particular endowments and non-item specific subsidies. To repeat, for item specific subsidies, India's bolster level was negative for the years announced by India and non-item specific sponsorships for India was just around 1.2 percent of the total estimation of agriculture production in the recent year as revealed by data. Consequently, the sponsorship reduction recommended in the July Framework is probably not going to create any issues for our country. Appropriation of agriculture in India will be obliged more by financial impulses as opposed to any nascent WTO rules. In any case, as a little note of alert, it can be called attention to that the base year for computation of ERP in the UR AoA was 1986-88. During this period, ware costs were at an abnormal state. Be that as it may, after 1996-97, there was a reduction in product costs upto 2002. Item costs were at a low level amid the period 1996-2002. If the current round of agreements change in the base time frame and if the new base time frame happens to correspond with one of the low valued item, then India's item specific allocation may turn positive. This can happen in light of the fact that the Minimum Support Prices given by the Government of India

have relentlessly increased throughout the years while the global product costs have experienced a precarious decrease. Truth be told, for a couple of products in specific years, India's MSP were higher than worldwide costs. However, to be reasonable, the base change, regardless of the possibility that it happens, is probably not going to correspond with a low valued period as it will hurt the greater subsidizers of agricultural substantially. In spite of the fact that India has shown that there exists strong political support to its economic development program, as has been demonstrated by the move of a few Governments in the recent decade, agricultural trade strategy changes should be quickened a great deal more than what has been done as such so far. The test is to relieve the uselessness that exists in the promotional strategies in Indian agriculture. India being an exporter in agriculture items, has more to choose and select from the options available in trade. It has high rates of the majority of the items and in this manner, adaptability can be guaranteed against competitors. India does not need to stress over its subsidies, as it is as of now below the required line and it likewise does not have any residential support to reckon with. Additionally, the progressing trades are probably going to yield enough adaptability in item decisions. A multilateral trading framework is in light of a legitimate concern for India, given the way that it is put in such a circumstance where no reasonable gathering fits well. In this way, India should work towards the accomplishment of the Doha round and meanwhile make utilization of the change its household market to acquire more proficiency. The interests of India are surely at fluctuation from the normal enthusiasm of developing nations, which turned out to be abundantly certain amid the Tokyo and Doha Ministerials, when the least developing nations allowed India to sit unbothered. A significant numbers of these nations are net merchants of sustenance, in addition, under the Everything But Arms (EBA) activity of the European Union, the LDCs have amount - and obligation of free access to the EU market, which was never accessible to India. The objectives for India is related to its development and to expand the pace of modern development. With adequate level of rates for agriculture produce in the country, the structure in country must be particular in relation to that of other developing nations. The circumstance is exceedingly relentless for India, especially in perspective of the certainty that the developing nations have figured out how to connect agriculture subsidies with the market access if the European Union needs to do more on agricultural tariff, and the US needs to accomplish more on decreasing agricultural subsidies, then the G-20 gathering of nations, where India is with

a key position, are likewise expected to accomplish more on modern tariff level. This is

a hard ball diversion. Additionally, every one of these issues are strongly connected to the future motivation of the WTO bury - alia as far as generous opening up trade administrations; rules administering transparency in two-sided trade understandings, anti dumping; transparency; exchange help; exchange and condition; WTO concession to Licensed Innovation Rights (TRIPS) and its connection with Convention on Bio-Assorted qualities (CBD), and expansions to land sign assurance (GIs); Debate Settlement and Aid for Trade. Customarily, India has fallen prey to the group since its interests don't completely affirm to the LDC, whose cause it used to champion nor does it drastically contrast from those of developing nations, who it goes up against. Along these lines, the time has sought India to leave uncertainty and make a balanced stride in the trading procedures to bridle best of its own advantages.

Agriculture Policy: Vision 2020

Some important points of our agricultural policy are reproduced here in original.

“Main Issues

In national priority setting, the following recurring and emerging issues for sustainable agricultural development and poverty alleviation must be considered:

- (i) Population pressure and demographic transition;
- (ii) Resource base degradation and water scarcity;
- (iii) Investment in agriculture, structural adjustment and impact on the poor;
- (iv) Globalization and implication on the poor;
- (v) Modern science and technology and support to research and technology development; and
- (vi) Rapid urbanization and urbanization of poverty, and deceleration in rural poverty reduction.

In addressing the above issues, a policy statement on agriculture must take note of the following uncommon opportunities:

- Conservation of natural resources and protection of environment.
- Vast untapped potential of our soil and water resources, and farming systems
- Technology revolution especially in the areas of molecular biology, biotechnology, space technology, ecology and management.
- Revolution in informatics and communication and the opportunity of linking farmers, extension workers and scientists with the national and international databases

Vision

The Agriculture Policy document must articulate a clear vision on following few basic parameters of the agricultural sector around which a policy framework must be developed.

- Organization of agriculture: A clear long-term vision where inter-sectoral linkages are explicit.

- Sustainability and natural resource management: Prescription must lie in the domain of political economy. Otherwise, allocating funds for watershed development, agroforestry, soil conservation, and so on will not produce desired results.
- Institutional change: Policy document must spell out new approaches and new institutions free from the shackles of bureaucratic and self-help framework.
- Investment priorities: There is a need to develop a consensus on investment themes, priorities and policies. Policy document must lend strength to the claim for greater investment in rural areas, and also re-examine its programmes in the light of complementarities.
- Incentives: Document must articulate a clear vision on the incentive framework.
- Risk management

Challenges, Policies and Strategies

Enhancing Yield of Major Commodities

Yield of major crops and livestock in the region is much lower than that in the rest of the world. Considering that the frontiers of expansion of cultivated area are almost closed in the region, the future increase in food production to meet the continuing high demand must come from increase in yield. There is a need to strengthen adaptive research and technology assessment, refinement and transfer capabilities of the country so that the existing wide technology transfer gaps are bridged. For this, an appropriate network of extension service needs to be created to stimulate and encourage both top-down and bottom-up flows of information between farmers, extension workers, and research scientists to promote the generation, adoption, and evaluation of location specific farm technologies. Ample scope exists for increasing genetic yield potential of a large number of vegetables, fruits as well as other food crops and livestock and fisheries products. Besides maintenance breeding, greater effort should be made towards developing hybrid varieties as well as varieties suitable for export purposes. Agronomic and soil researches in the region need to be intensified to address location specific problems as factor productivity growth is decelerating in major production regimes. Research on coarse grains, pulses and oilseeds must achieve a production breakthrough. Hybrid rice, single cross hybrids of maize and pigeonpea hybrids offer new opportunities. Soybean, sunflower and oil palm will help in meeting future oil demands successfully. Forest cover must be preserved to keep off climatic disturbances and to provide enough of fuel and fodder. Milk, meat and draught capacity of our animals needs to be improved quickly through better management practices.

Integrated nutrient management: Attention should be given to balanced use of nutrients. Phosphorus deficiency is now the most widespread soil fertility problem in both irrigated and unirrigated areas. Correcting the distortion in relative prices of primary fertilizers could help correct the imbalances in the use of primary plant nutrients-nitrogen, phosphorus, and potash and use of bio-fertilizers. To improve efficiency of fertilizer use, what is really needed is enhanced

location-specific research on efficient fertilizer practices (such as balanced use of nutrients, correct timing and placement of fertilizers, and, wherever necessary, use of micronutrient and soil amendments), improvement in soil testing services, development of improved fertilizer supply and distribution systems, and development of physical and institutional infrastructure.

Arresting deceleration in total factor productivity: Public investment in irrigation, infrastructure development (road, electricity), research and extension and efficient use of water and plant nutrients are the dominant sources of TFP growth. The sharp deceleration in total investment and more so in public sector investment in agriculture is the main cause for the deceleration. This has resulted in the slow-down in the growth of irrigated area and a sharp deceleration in the rate of growth of fertiliser consumption. The most serious effect of deceleration in total investment has been on agricultural research and extension. This trend must be reversed as the projected increase in food and non-food production must accrue essentially through increasing yield per hectare. Recognising that there are serious yield gaps and there are already proven paths for increasing productivity, it is very important for India to maintain a steady growth rate in total factor productivity. As the TFP increases, the cost of production decreases and the prices also decrease and stabilise. Both producer and consumer share the benefits.

The fall in food prices will benefit the urban and rural poor more than the upper income groups, because the former spend a much larger proportion of their income on cereals than the latter. All the efforts need to be concentrated on accelerating growth in TFP, whilst conserving natural resources and promoting ecological integrity of agricultural system. More than half of the required growth in yield to meet the target of demand must be met from research efforts by developing location specific and low input use technologies with the emphasis on the regions where the current yields are below the required national average yield.

Literacy had a positive and significant relation with crop productivity and a strong link exists between literacy and farm modernization. A recent study (Kumar and Mittal, 2000), has shown that literacy emerged as an important source of growth in adoption of technology, use of modern inputs like machines, fertilizers, and yield. Recognizing that in the liberalized economic environment, efficiency and growth orientation will attract maximum attention. Literacy will play a far more important role in the globalised world than it did in the past. Contribution of literacy, through TFP, will be substantial on yield growth and domestic supply. As future agriculture will increasingly be science-led and will require modern economic management, high return to investment on education is expected.

The investments that are good for agricultural growth-technology and its dissemination, rural infrastructure (roads), education and irrigation - amount to a 'win-win' strategy for reducing rural poverty by also increasing the non-farm economy and raising rural wages. Creating infrastructure in less developed areas, better management of infrastructure and introduction of new technologies can further enhance resource productivity and TFP. Generation and effective assessment and diffusion of packages of appropriate technologies involving system and programme based approach, participatory mechanisms, greater congruency between productivity and sustainability through integrated pest management and integrated soil-water-irrigation-

nutrient management should be aggressively promoted to bridge the yield gaps in most field crops. Besides this, efforts must be in place to defend the gains and to make new gains particularly through the congruence of gene revolution, informatics revolution, management revolution and eco-technology.-Many observers have expressed concern that technological gains have not occurred in a number of crops, notably coarse cereals, pulses and in rainfed areas.

Recent analysis on TFP growth based on cost of cultivation data does not prove this perception . In all the 18 major crops considered in the analysis, several states have recorded positive TFP growth. This is spread over major cereals, coarse grains, pulses, oilseeds, fibers, vegetables, etc. In most cases, in the major producing states, rain-fed crops also, showed productivity gains. There is thus strong evidence that technological change has generally pervaded the entire crop sector. There are, of course, crops and states where technological stagnation or decline is apparent and these are the priorities for present and future agricultural research. Farming system research to develop location specific technologies and strategy to make grey areas green by adopting three-pronged approach - watershed management, hybrid technology and small farm mechanization will accelerate growth in TFP. It is necessary to enlarge the efforts for promoting available dry land technologies. Promoting efficient fertilizer practices, improving soil-testing services, strengthening distribution channel of critical inputs specially quality seed and development of physical and institutional infrastructure will help resource-poorfarmers. Bridging Yield Gaps: Vast untapped potential in the yield exists for all crops in most of the states accounting for more than three-fourths of crop area. Emphasis must be given to the states in which current yield levels are below the national average yield.

Bihar, Orissa, Assam, West Bengal and Uttar Pradesh are the priority states accounting for 66% of rice area which need emphasis on bridging yield gaps to attain target demand and yield growth. For wheat we must focus mainly on Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan accounting for 68% of wheat area. For coarse cereals, major emphasis must be given to Rajasthan, Maharashtra, Karnataka, Madhya Pradesh, Andhra Pradesh and Uttar Pradesh. To meet the demand for pulses greater emphasis is needed in almost all the states with particular focus on Madhya Pradesh, Maharashtra, Rajasthan, Gujarat, Andhra Pradesh, Karnataka and Uttar Pradesh which have three-fourths of total pulse area. The target growth in pulse yield from these states annually must be 6 per cent; otherwise the nation will experience shortage of pulses for all times to come. The task of attaining self sufficient in pulses production looks difficult without area expansion and irrigation. In cases of oilseeds greater emphasis is needed on Andhra Pradesh, Madhya Pradesh, Rajasthan, Maharashtra, Karnataka, West Bengal and Uttar Pradesh to increase the yield by about 4 per cent. The possibilities of developing processing industry for extracting edible oils from non-oilseeds commodities, like rice bran etc, needing to be explored. The introduction of palm cultivation for oil production may release pressure on traditional oilseeds crops to meet future edible oil demand. In case of sugarcane, research and development efforts are to be strengthened in Uttar Pradesh and Bihar to increase the yields per hectare by about 4% per annum. The demand for sugar can also be met by developing mini sugar mills so that substantial sugarcane production can be diverted from Khandasari to sugar production. This may also help release some sugarcane area to other crops. Cotton crop requires greater yield

improvement emphasis on 81 per cent of the cotton area in Maharashtra, Gujarat and Andhra Pradesh.

Water for Sustainable Food Security

India will be required to produce more and more from less and less land and water resources. Alarming rates of ground water depletion and serious environmental and social problems of some of the major irrigation projects on one hand, and the multiple benefits of irrigation water in enhancing production and productivity, food security, poverty alleviation, as mentioned earlier, are well known to be further elaborated here: In India, water availability per capita was over 5000 cubic metres (m³) per annum in 1950. It now stands at around 2000 m³ and is projected to decline to 1500 m³ by 2025. Further, the quality of available water is deteriorating. Also, there are gross inequalities between basins and geographic regions.

Agriculture is the biggest user of water, accounting for about 80 percent of the water withdrawals. There are pressures for diverting water from agriculture to other sectors. A study has warned that re-allocation of water out of agriculture can have a dramatic impact on global food markets. It is projected that availability of water for agricultural use in India may be reduced by 21 percent by 2020, resulting: in drop of yields of irrigated crops, especially rice, thus price rise and withdrawal of food from poor masses. Policy reforms are needed from now to avoid the negative developments in the years to come. These reforms may include the establishment of secure water rights to users, the decentralization and privatization of water. Management functions to appropriate levels, pricing reforms, markets in tradable property rights, and the introduction of appropriate water-saving technologies.

The needs of other sectors for water cannot be ignored. Therefore it is necessary that an integrated water use policy is formulated and judiciously implemented. Several international initiatives on this aspect have been taken in recent years. India should critically examine these initiatives and develop its country-specific system for judicious and integrated use and management of water. A national institution should be established to assess the various issues, regulatory concerns, water laws and legislations, research and technology development and dissemination, social mobilization and participatory and community involvement, including gender and equity concerns and economic aspects. This institution should function in a trusteeship mode and seen as the flagship of a national system for sustainable water security.

Emphasis on Rain fed Ecosystem

Resource-poor farmers in the rain fed ecosystems practice less-intensive agriculture, and since their incomes depend on local agriculture, they benefit little from increased food production in irrigated areas. To help them, efforts must be increased to disseminate available dry land technologies and to generate new ones. It will be necessary to enlarge the efforts for promoting available dry land technologies, increasing the stock of this knowledge, and removing pro-irrigation biases in public investment and expenditure, as well as credit flows, for technology-based agricultural growth. Water-shed development for raising yields of rainfed crops and widening of seed revolution to cover oilseeds, pulses, fruits

and vegetables. Farming system research to develop location specific technologies must be intensified in the rainfed areas. Strategy to make grey areas green will lead to second Green Revolution, which would demand three-pronged strategy - watershed management, hybrid technology and small farm mechanisation.

Accent on Diversification of Agriculture and Value Addition

In the face of shrinking natural resources and ever increasing demand for larger food and agricultural production arising due to high population and income growths, agricultural intensification is the main course of future growth of agriculture in the region. Research for product diversification should be yet another important area.

Besides developing technologies for promoting intensification, the country must give greater attention to the development of technologies that will facilitate agricultural diversification particularly towards intensive production of fruits, vegetables, flowers and other high value crops that are expected to increase income growth and generate effective demand for food. The per capita availability of arable land is quite low and declining over time. Diversification towards these high value and labour intensive commodities can provide adequate income and employment to the farmers dependent on small size of farms. Due importance should be given to quality and nutritional aspects. High attention should be given to develop post-harvest handling and agro-processing and value addition technologies not only to reduce the heavy post-harvest losses and also improve quality through proper storage, packaging, handling and transport. The role of biotechnology in post-harvest management and value addition deserves to be enhanced.

Accent on Post-Harvest Management, Value Addition and Cost-Effectiveness

Post-harvest losses generally range from 5 to 10 percent for non-perishables and about 30 percent for perishables. This loss could be and must be minimized. Let us remember, a grain saved is a grain produced. Emphasis should therefore be placed to develop post-harvest handling, agro-processing and value-addition technologies not only to prevent the high losses, but also to improve quality through proper storage, packaging, handling and transport. With the thrust on globalization and increasing competitiveness, this approach will improve the agricultural export contribution of India, which is proportionately extremely low. Cost-effectiveness in production and post-harvest handling through the application of latest technologies will be a necessity. The agro-processing facilities should preferably be located close to the points of production in rural areas, which will greatly promote off-farm employment. Such centres of processing and value addition will encourage production by masses against mass production in factories located in urban areas. Agricultural cooperatives and Gram Panchayats must play a leading role in this effort. In doing so, the needs of small farmers should be kept in mind.

Increased Investment in Agriculture and Infrastructures

The public investment in agriculture has been declining and is one of the main reasons behind the declining productivity and low capital formation in the agriculture sector. With the burden on productivity - driven growth in the future, this worrisome trend must be reversed. Private

investment in agriculture has also been slow and must be stimulated through appropriate policies. Considering that nearly 70 percent of India still lives in villages, agricultural growth will continue to be the engine of broad-based economic growth and development as well as of natural resource conservation, leave alone food security and poverty alleviation. Accelerated investment are needed to facilitate agricultural and rural development through:

- Productivity increasing varieties of crops, breeds of livestock, strains of microbes and efficient packages of technologies, particularly those for land and water management, for obviating biotic, a biotic, socio-economic and environmental constraints;
- Yield increasing and environmentally-friendly production and post-harvest and value-addition technologies;
- Reliable and timely availability of quality inputs at reasonable prices, institutional and credit supports, especially for small and resource-poor farmers, and support to land and water resources development;
- Effective and credible technology, procurement, assessment and transfer and extension system involving appropriate linkages and partnerships; again with an emphasis on reaching the small farmers;
- Improved institutional and credit support and increased rural employment opportunities, including those through creating agriculture-based rural agro-processing and agro-industries, improved rural infrastructures, including access to information, and effective markets, farm to market roads and related infrastructure;
- Particular attention to the needs and participation of women farmers; and
- Primary education, health care, clean drinking water, safe sanitation, adequate nutrition, particularly for children (including through mid-day meal at schools) and women.

The above investments will need to be supported through appropriate policies that do not discriminate against agriculture and the rural poor. Given the increasing role of small farmers in food security and poverty alleviation, development efforts must be geared to meet the needs and potential of such farmers through their active participation in the growth process.

Government should facilitate and support community level action by private voluntary organizations, including farmers groups aimed at improving food security, reducing poverty, and assuring sustainability in the management of natural resources. In addition, governments should enhance efforts to ensure good nutrition and access to sufficient food for all through primary health care and education for all.

Modern biotechnology tools, genetic engineering, as well as conventional breeding methods are all expected to play important roles in the generation of higher yielding, pest and stress resistant

varieties of rice, wheat, maize and other cereal crops. The availability of genetic innovations in developing countries will depend on continued high levels of investments in agricultural research, both at the international and the national levels. Free and unhindered access to germplasm to breeders worldwide is absolutely crucial to the rapid dissemination and adoption of improved germplasm. This free movement and the dissemination of modern biotechnology innovations to developing countries are hampered by increased patent protection and private sector investments. There is an urgent need to address this problem of free access to technology in the future.

Increased attention will also have to be given to development of sustainable systems that protect the natural resource base. Recent evidence of resource degradation and declining productivity in some intensively cropped areas is of particular concern. Also population driven intensification of agriculture without the use of external inputs, is leading to a serious problem of mining soil fertility

Sustaining global food supplies will depend on continued high levels of investments in research and technology development. It is essential that research capacity has to be increased substantially. In addition to investments in research, infrastructure investments, particularly in irrigation, transport and market infrastructure development are equally important for sustaining the productivity and profitability of food crop production.

Mobilize the best of science and development efforts (including traditional knowledge and modern scientific approach) through partnerships involving national and international research institutions, NGOs, farmers' organizations and private sector in order to tackle the present and future problems of food security and production. Donors and Government must urgently increase funding for agricultural research targeted at the needs of the rural and urban poor, and every effort must be made to ensure the free flow of information, technology and germplasm so that a proper sustainable agriculture can be achieved.

Fighting Poverty and Hunger

Nearly one-fourth of India's population, 251 million out of nearly one billion, is below the poverty line. One hundred seventy millions of the poor, 68 percent, are rural and the remaining 32 percent are urban (Table 4). Number at the national level in rural area has decreased after 1983; the number of poor in the cities has been increasing. This is essentially due to migration of the destitute from villages to cities. There are serious implications of this trend on feeding the cities and food security of urban people, urban poverty and environment. A question may be asked as to whether the rural settings and opportunities could be improved for securing livelihood security and consequently rationalizing the migration to the cities.

An analysis of the incidence of rural poverty and hunger by farm size revealed that more than half of the landless people are poor. Poverty got significantly reduced from 54 percent in the landless group to 38 percent in the sub-marginal group (Table 5), suggesting that even a small piece of land, less than 1/2 hectare, can greatly reduce both poverty and hunger¹. The incidence of hunger and poverty gets reduced as one is able to meet even part of his/her dietary energy

requirement through growing his/her own food (Table 6). Studies show that even a small plot of one's own helps women to escape extreme poverty and deprivation. Land is the main asset for livelihood security.

Although several factors affect the extent and depth of poverty and hunger, some of them have overwhelming impacts under the Indian setting. These include, irrigation, farming system and literacy. Generally, there is higher concentration of poor, and hungry people in rainfed areas as compared with those in irrigated zones. Even with 20 percent of the irrigation intensity, there is a sharp fall in the proportion of hunger and poverty and it remains there irrespective of further intensification of irrigation (Table 7). Evidences suggest that extensive irrigation will prove much more effective than to adding more and more water, and often wasting it along with the associated degradation of the natural resources. Such a policy will not only reduce poverty and hunger, but will also promote equity and environmental protection and natural resource conservation. An effective water policy and institutional support is needed to ensure judicious and equitable allocation, distribution and exploitation of water and water resources. Livestock has the highest effect on reducing poverty and hunger. In rural India, 43 percent of the people who do not own even a single livestock are malnourished. Addition of one cattle or one buffalo to their assets reduces the hunger prevalence by 16 and 25 percentage points, respectively (Table 8). Only 14 percent of the people who owned one cattle and one buffalo were malnourished. In urban areas also, the addition of one cattle or one buffalo had significant impact on reduction of proportion of

1 Energy intake below minimum energy requirement (kcal/person/day). Three-fourth of recommended calories (2400/person/day) for rural India that is 1800 kcal/person/day is used the threshold level. An average individual has an intake below this level (the threshold) is undernourished because they do not eat enough to maintain health, body weight and to under take light activity. Livestock sector should also receive high priority with multiple objectives of diversifying agriculture, raising income and meeting the nutritional security of the poor farm households.

Literacy has a very high impact on poverty alleviation as well as on hunger reduction (Table 9). The illiterate people, whether urban or rural, are the most poor and malnourished. In urban areas the impact of literacy on poverty is the highest. Education, even above primary level, is extremely effective in reducing both poverty and hunger. Graduate and technical education is, of course, the most important instrument for reducing both poverty and hunger. But its impact is most visible on poverty reduction. Therefore, the education policy of the country must be geared to remove illiteracy as soon as possible, as 50 percent of our people are still illiterate. Free education up to 8th standard coupled with mid-day meal in the schools will go a long way in reducing both poverty and hunger and will thus help build a strong India. Further, this move will greatly reduce the violation of child labour laws and will offset some of the non-tariff restrictions imposed by developed countries on exports from developing countries on the grounds of use of child labour.

Accent on Empowering the Small Farmers

Contributions of small holders in securing food for growing population have increased considerably even though they are most insecure and vulnerable group in the society. The off-farm and non-farm employment opportunities can play an important role. Against expectation under the liberalized scenario, the non-agricultural employment in rural areas has not improved. Greater emphasis needs to be placed on non-farm employment and appropriate budgetary allocations and rural credit through banking systems should be in place to promote appropriate rural enterprises. Specific human resource and skill development programmes to train them will make them better decision-makers and highly productive. Human resource development for increasing productivity of these small holders should get high priority. Thus, knowledge and skill development of rural people both in agriculture and non-agriculture sectors is essential for achieving economic and social goals. A careful balance will therefore need to be maintained between the agricultural and non-agricultural employment and farm and non-farm economy, as the two sectors are closely inter-connected.

Raising agricultural productivity requires continuing investments in human resource development, agricultural research and development, improved information and extension, market, roads and related infrastructure development and efficient small-scale, farmer-controlled irrigation technologies, and custom hiring services. Such investments would give small farmers the options and flexibility to adjust and respond to market conditions.

For poor farm-households whose major endowment is its labour force, economic growth with equity will give increased entitlement by offering favourable markets for its products and more employment opportunities. Economic growth if not managed suitably, can lead to growing inequalities. Agrarian reforms to alleviate unequal access to land, compounded by unequal access to water, credit, knowledge and markets, have not only rectified income distribution but also resulted in sharp increases in productivity and hence need to be adopted widely. Further, targeted measures that not only address the immediate food and health care requirements of disadvantaged groups, but also providethem with developmental means, like access to inputs, infrastructure, services and most important, education should be taken.

Identification of need-based productive programs is very critical, which can be explored through characterization of production environment. We have to develop demand-driven and location-specific programs to meet the requirements of different regions to meet the nutritional security of most vulnerable population in the rural areas.

Improved agricultural technology, irrigation, livestock sector and literacy will be most important instruments for improving the nutritional security of the farm-households. Watershed development and water saving techniques will have far reaching implications in increasing agricultural production and raising calorie intake in the rainfed areas. Livestock sector should receive high priority with multiple objectives of diversifying agriculture, raising income and meeting the nutritional security of the poor farm households. Need based and location-specific community programs, which promise to raise nutritional security, should be identified and

effectively implemented. Expansion of micro credit programmes for income-generation activities, innovative approaches to promote family planning and providing primary health services to people and livestock and education should enhance labour productivity and adoption of new technologies. Development of the post-harvest sector, co-operatives, roads, education, and research and development should be an investment priority. A congenial policy environment is needed to enable smaller holders to take the advantage of available techniques of production, which can generate more incomes and employment in villages. For this poor farmer needs the support of necessary services in the form of backward and forward linkages. Small-mechanised tools, which minimise drudgery and do not reduce employment, but only add value to the working hours are needed to enhance labour productivity. Special safety nets should be designed and implemented for them. Can agricultural co-operatives internalise and galvanize these marginal and excluded people? Off-farm employment provided through co-operatives will go a long way in pulling them out of the state where poverty breeds poverty. Therefore, investment in the empowerment of the small landholders will pay off handsomely. Let us create rural centers of production and processing by masses through co-operatives or empowerment of Gram Panchayats to promote co-operatives. This will improve efficiency of input and output marketing and give higher income. There is need to disseminate widely post-harvest handling and agro-processing and value addition technologies not only to reduce the heavy post-harvest losses but also improve quality through proper storage, packaging, handling and transport. Panchayati Raj institutions and co-operatives can play significant role in all these directions. Giving them power over the administration, as contemplated under the 73rd and 74th Amendment of the Constitution has not been implemented seriously so far in any of the states.

Disaster Management

The frequency and intensity of disasters such as floods, droughts, cyclones and earthquakes have increased in the recent years. The devastating earthquake in Gujarat has brought untold miseries to the whole state and caused a national disaster. Special effort should be made to develop appropriate technologies for increasing preparedness to predict and to manage the disasters. Effective and reliable information and communication systems, contingency planning and national and international mobilization of technologies and resources are a must. Experiences of other countries in prevention and management of the disasters should be shared.

Keeping Pace with Globalization

The globalization of agricultural trade will bring to the fore access to markets; new opportunities for employment and income generation; productivity gains and increased flow of investments into sustainable agriculture and rural development. I believe that if managed well, the liberalization of agricultural markets will be beneficial to developing countries in the long run, It will force the adoption of new technologies, shift production functions upwards and attract new capital into the deprived sector. However, this will only come to pass if we are mindful of the interests of billions of small and subsistence oriented farmers, fisher-folk and forest dwellers in the short and medium term. So far the magic of globalization has not been felt in India. During the past one-decade of liberalization certain trends such as deceleration of the growth rate of

agricultural GDP, declaration in yield growth rates, and low non-agricultural employment have emerged against expectations. As we globalize, however, it is imperative that we do not forget social aspirations for a more just, equitable and sustainable way of life. Trade agreements must be accompanied by operationally effective measures to ease the adjustment process for a small farmer in developing countries.

Exploiting Cyberspace

Information is power and will underpin future progress and prosperity. Efforts must be made to strengthen the informatics in agriculture by developing new databases, linking databases with international databases and adding value to information to facilitate decision making at various levels. Development of production models for various agro-ecological regimes to forecast the, production potential should assume greater importance. Using the remote sensing and GIS technologies, natural and other agricultural resource should be mapped at micro and macro levels and effectively used for land and water use planning as well as agricultural forecasting, market intelligence and e-business, contingency planning and prediction of disease and pest incidences.”

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