भाकृअनुप
ICAR

आज़ादी का अमृत महोत्सव

NAHEP

ICAR LECTURE SERIES #29

आज़ादी का अमृत महोत्सव
AZADI KA AMRIT MAHOTSAV

Friday, 24th September 2021 | 03:00 PM

Agriculture in post-independent India: Looking back and looking ahead

Prof. Ramesh Chand

Member, NITI Aayog

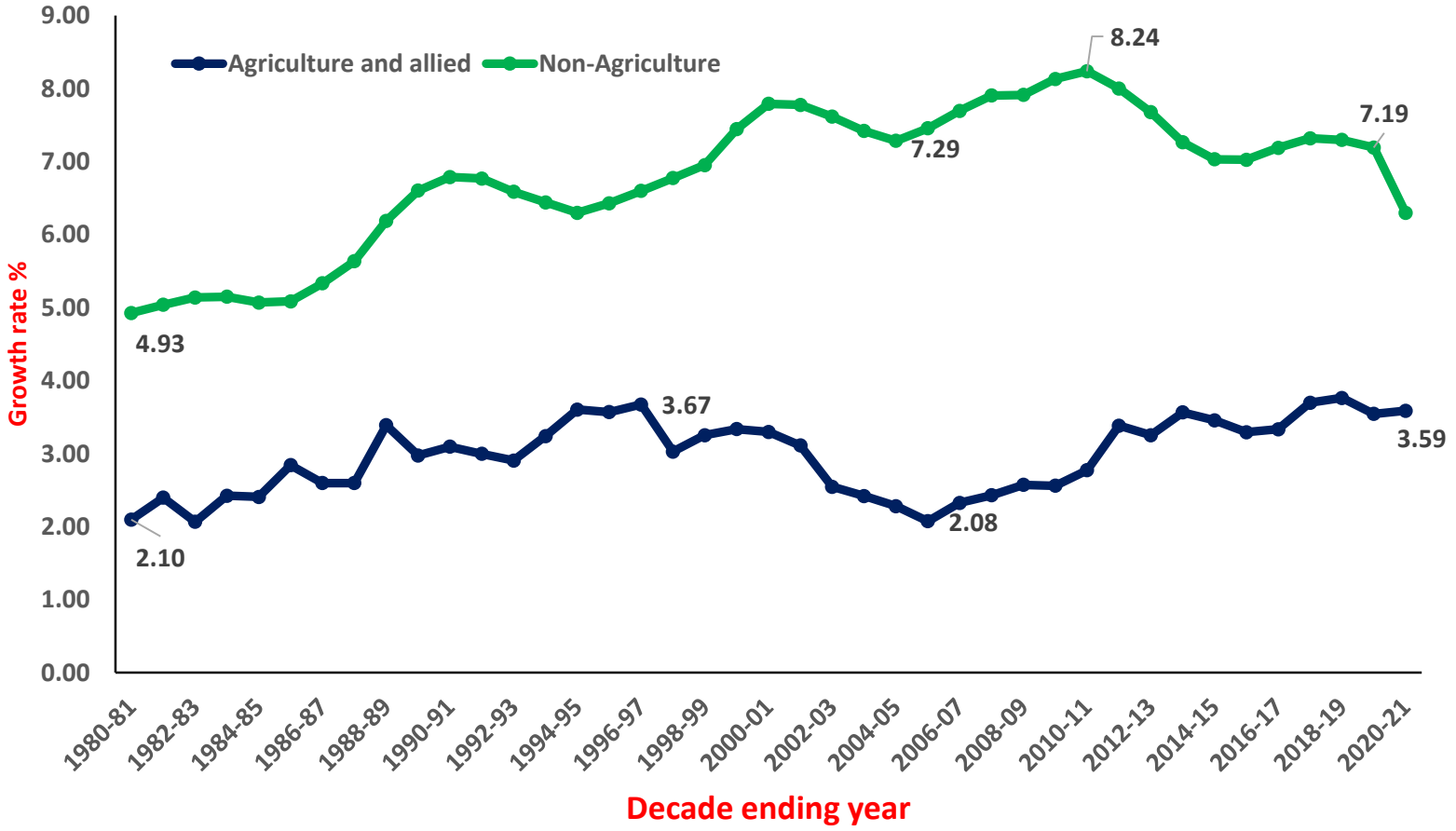
To attend the lecture visit
icar75lectureseries.webconevents.com

WATCH LIVE www.icar.org.in www.icar.gov.in /InAgrisearch /icarindia

Agriculture in Post Independence India
Looking Back and Looking Ahead

Ramesh Chand
NITI Aayog
New Delhi, 24 Sept, 2021

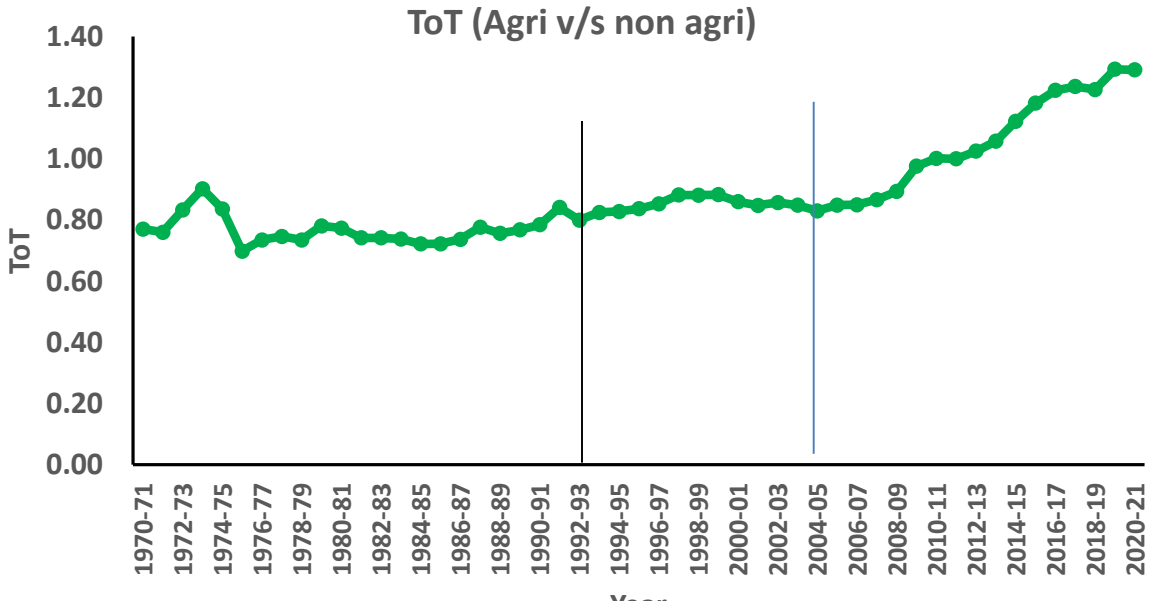
Five Decades of Growth Trajectory of Agriculture and Non Agriculture 1971-2021



Growth in GVA and Terms of Trade in Different Periods

Sub- Sector	Trend Growth rate %			
	1950-51 to 1964-65	1967-68 to 1990-91	1990-91 to 2004-05	2004-05 to 2020-21
Agriculture & allied	2.54	2.53	2.74	3.56
Non-Agriculture	5.86	5.31	7.39	6.90
Human population	2.03	2.22	1.88	1.38
Bovine Population	0.93	0.91	0.18	0.20
Crops	2.66	2.75	2.71	2.40
Livestock	2.64	2.69	2.73	6.88
Fishing & aquaculture	4.79	3.66	4.40	6.72

1965-66 and 1966-67 were very serious drought years, which brought down agri output drastically (-12.5%).



Four stages of agri Growth:

I: Beginning of active policy, irrigation, land reforms. Area expansion.

II: Revival of growth rate after 1967-67 driven primarily by technology. TOT flat. GRT put ag on better growth trajectory

III: Technology slowed down but spread to other areas, liberalized economy. GR slightly accelerate

IV: Primarily demand and price driven. GR further accelerated. Livestock take over crops and horti take over non horti in growth.

Prepared sector for demand driven transformation.

Growth Rate in OUTPUT of Different Groups of Crops and Other Agri Products

Sub- Sector	Trend Growth rate %			
	1950-51 to 1964-65	1967-68 to 1990-91	1990-91 to 2004-05	2004-05 to 2020-21
All Crops	2.81	2.63	2.29	2.65
Rice+Wheat+Maize	4.28	3.36	1.38	2.37
Jowar+bajra+ragi+ small millets	2.38	0.86	-1.62	-1.94
Pulses	1.68	0.98	0.20	4.04
Oilseeds	3.03	2.87	0.47	1.34
Fruits & vegetables	1.73	3.46	4.70	4.84
Milk Group	1.21	5.02	3.96	5.09
Egg	3.42	6.76	4.11	5.38
Meat	1.62	4.03	3.37	7.18
Fish	4.77	3.65	4.35	6.74

Inclusion of 1965-66 and 1966-67 on either side alter pattern of trend. Two drought years put country into despair, which seems difficult to overcome. Green Rev technology came to the rescue.

- First 15 years beginning plan period show highest growth in crop output. Low base effect.
- Beginning Green Rev, superiority of RW established. Millet and pulses suffered.
- Millets show falling growth and reached negative territory in recent years. Pulses growth revived after 2004-05. Lowered dietary diversity within foodgrains.
- NFSM and BGREI raised growth of fine cereals and pulses.
- Nutri cereals decelerated throughout and reached negative zone
- Oilseeds gr lost momentum beginning 1991 leading to heavy import dependence.
- HVP impressive growth.
- Strong role of demand driven factors.

State-wise Growth in Gross Value Added in Crop Sector and Total Agriculture 2011-12 to 2019-20

State	Growth rate % (avg. Y-o-Y change)	
	Agri & allied	Crop
Kerala	-2.19	-3.63
Bihar	2.02	-1.26
Chandigarh	2.03	-1.19
Uttarakhand	0.88	-0.78
A&N Islands	1.99	-0.50
Arun. Pradesh	3.46	-0.47
Goa	2.66	-0.03
Jharkhand	1.96	0.08
Punjab	2.19	0.69
Tamil Nadu	4.96	0.91
Haryana	3.50	1.05
J&K	2.89	1.50
Maharashtra	2.88	1.98
Rajasthan	4.69	2.01
West Bengal	2.60	2.09
Uttar Pradesh	2.72	2.27
Assam	2.60	2.95
Gujarat	4.56	2.96
Karnataka	3.80	3.38
Mizoram	15.48	3.45
Meghalaya	4.04	3.58
HP	4.14	3.62
Chhatisgarh	4.79	3.75
Odisha	4.54	3.98
Nagaland	1.65	4.19
Andhra Pra	8.92	5.41
Telangana	6.50	6.59
Sikkim	6.78	6.59
Tripura	8.02	6.87

Messages

- In most states GR of total agri is robust but GR of Crop sector varies from -3.6 to 1% in 10/29 states. Only 11/29 states show more than 3% gr in income from crop sector. Even here, the major source of growth is due to horticulture.
- Farmers in most cases identify their income with income from crop sector only. Bulk of farmers experienced negative or meagre growth from crop sector.
- Share of crop sector squeezing:
  - 2011-12: 65.4%. 2018-19: 55.3%.
- This is a wake up call for crop sciences? And policy makers?
- *Farm protests around field crops issue.*

Changes in Workforce in Agriculture

Year	Total Population	Average Annual Exponential Growth Rate (%)	Rural Population	Total Workers	Agricultural Workers		
					Cultivators	Agricultural Labourers	Total
1971	548.2	2.20	439.0	180.4	78.2	47.5	125.7
			(80.1)		(62.2)*	(37.8)*	(69.7)**
1981	683.3	2.22	525.6	244.6	92.5	55.5	148.0
			(76.9)		(62.5)	(37.5)	(60.5)
1991	846.4	2.16	630.6	314.1	110.7	74.6	185.3
			(74.5)		(59.7)	(40.3)	(59.0)
2001	1028.7	1.97	742.6	402.2	127.3	106.8	234.1
			(72.2)		(54.4)	(45.6)	(58.2)
2011	1210.8	1.50	833.7	481.7	118.8	144.3	263.1
			(68.9)		(45.1)	(54.9)	(54.6)

Note: * Share in agri workers. ** share of agri worker in total workforce

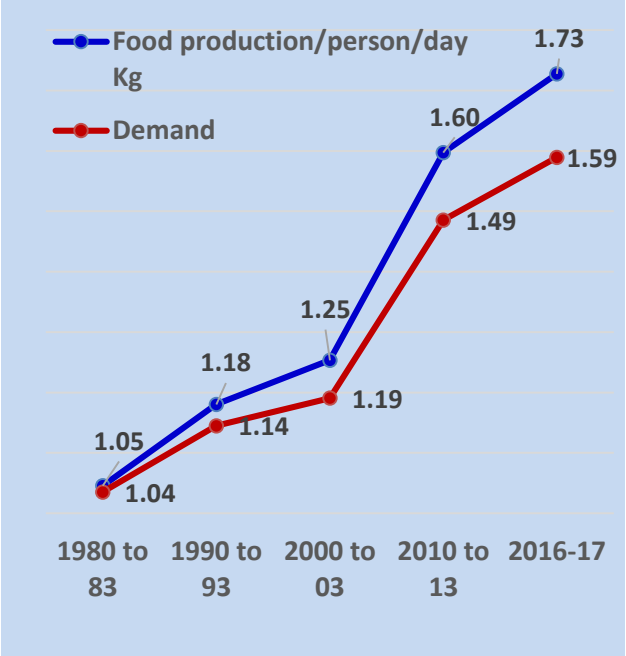
- Till 2001 it was going BAU after which two significant changes in agri workforce:
  - Number of cultivators and % of agri workers in total workforce witnessed significant decline.
  - Some cultivators who left agri and joined rank of agri labour (compulsion)
- Highest growth of non agri during 2001-2011 helped in pulling some workers from agriculture

Food Intake and Nutrition: An Indian Enigma

Changes in hunger last two decades

Country/ Region	Hunger/ Under-nourishment	1995/ 97	2005/ 07	2010/ 12	2015/ 17
India	People under-nourished (million)	204.4	228.8	195.0	187.6
	Prevalence %	20.8	19.6	15.6	14.2
World	People under-nourished (million)	787.5	762.3	636.7	616.6
	Prevalence %	14.0	11.5	9.0	8.2

Significant improvement after 2005 when gr ^



Nutrition and health indicators in South Asia

Indicator %	India	Bangla-desh	Nepal	Paki-stan	Sri-Lanka
Population undernourished	15.3	9.7	4.8	12.9	6.8
Wasting Children: under 5 year	17.3	9.8	12.0	7.1	15.1
Stunting Children: under 5 year	30.9	30.2	30.4	36.7	16.0
Anemia in women: 15-49 year	53.0	36.7	35.7	41.3	34.6

Despite being food surplus and net exporter, nutrition and health outcome? Paradox

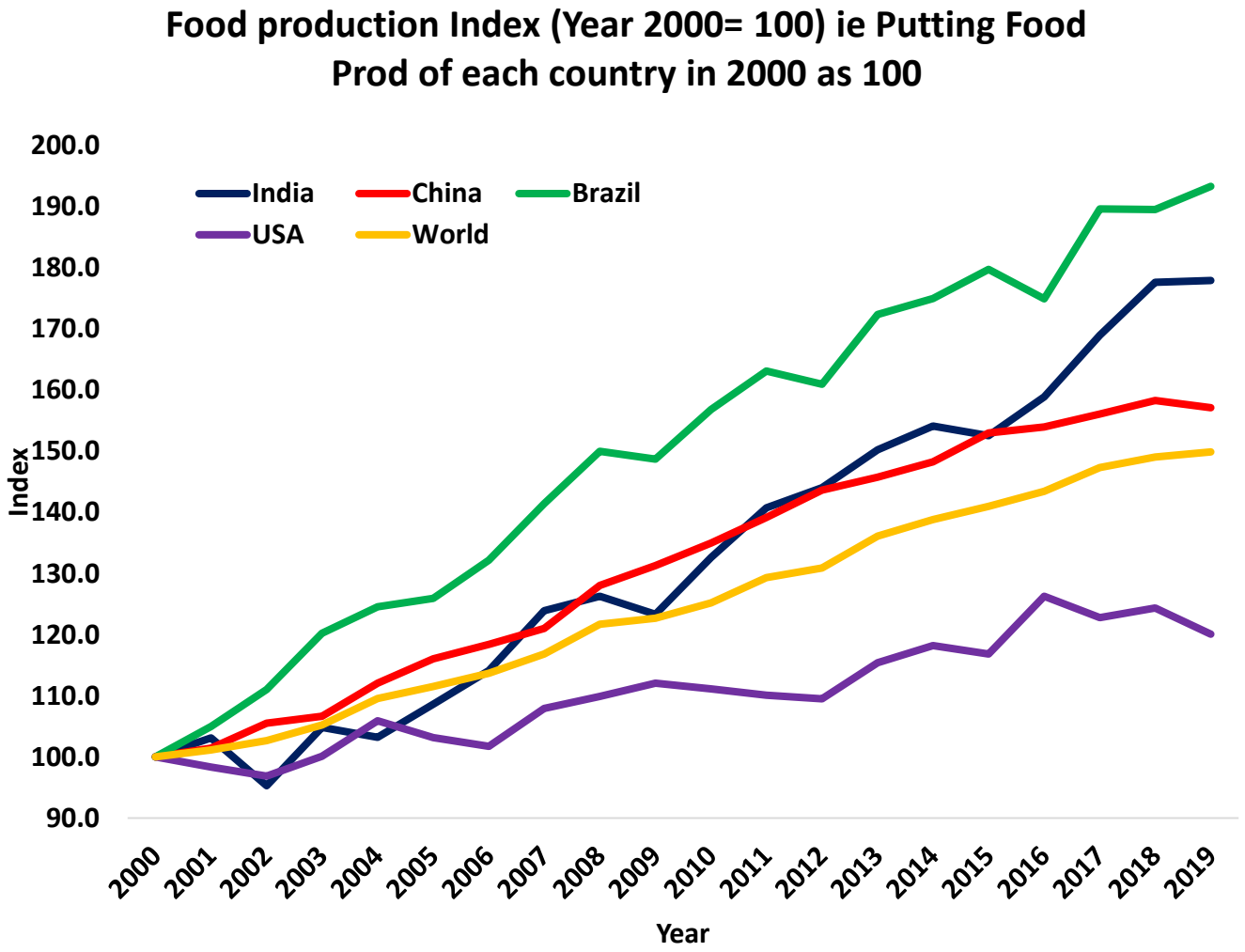
Recent Situation Assessment Survey of Agri Households: Serious Definitional Issues

Source of Income	July 2012-June 2013	July 2018 - June 2019
Wages/salary	2071 (32.2)	4063 (39.8)
Leasing out of land	-	134 (1.3)
Cultivation	3081 (47.9)	3798 (37.2)
Farming of animals	763 (11.9)	1582 (15.5)
Non-farm business	512 (8.0)	641 (6.3)
Total Income	6426 (100)	10218 (100)

Land Size Group	Monthly Income, All source Rs
Land less	11204
0.01-0.4 hec	7522
0.4-1 hec	8571
1.01-2 hec	11449
2.01-4 hec	16435
4.01-10 hec	28292
10+ hec	60758
All Size	10218

- Lot of care needed in interpreting this data. Need consistency check.
- Agriculture household and farmers not same.
- Landless with subsidiary occupation included in Agri H. hold. Mainly wage earners
- Those who cling to tiny holdings, earn less than landless
- Study def carefully.

Agri Performance in Global Context



Trend GR 2000-2019	
India	3.42
World	2.32
China	2.67
Brazil	3.46
USA	1.31

Source: FAOstat-2021

Some Myths About Indian Agriculture

- **Feminisation of agriculture. PLFS 2017-18 Rural**
  - **Female 30% of Ag workforce but agri employs 73% of total rural female workers. Fact**
- **Profit is squeezing. No evidence at national level. See States.**
- **Indian farmers receive much less support as compared to other countries. Fact**
- **Fertiliser use is much imbalanced in the Country. Fact.**
- **Indian agriculture is net taxed as AMS is negative. Fact**

Subsidies and Public Investments in Agriculture and Allied Sectors

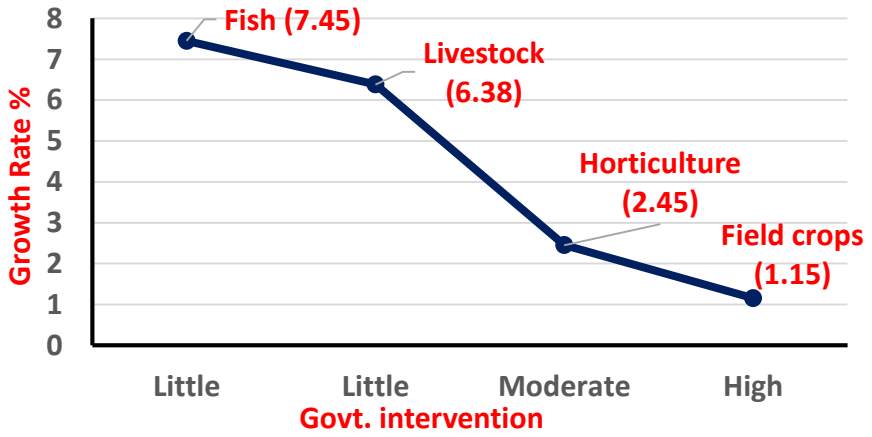
Year	Agri subsidy (000 Crore at current prices)		Public Investment in Agri 000 cr	Subsidy/hec Rs.	
	Incl. power subsidy	Excl. power subsidy		Incl. power	Excl. power
2011-12	165	100.5	35.7	11707	7128
2012-13	181	107.6	39.7	12924	7631
2013-14	176	103.2	40.8	12457	7319
2014-15	195	106.2	47.3	13888	7532
2015-16	216	108.1	56.2	15431	7670
2016-17	-	97.6	66.9	-	6923
2017-18	-	127.3	67.1	-	9029
2018-19	-	151.3	92.6	-	10728

Subsidy as % of GDP Agri (incl. power):	>10.0
PM Kisan Samman Nidhi:	2.0
Pub Investments as % of GDP agri:	2.62
Private Corporate share in agri investments %:	1.22

Traditional Crop Sector which Affect Vast Majority of Farmers show Minimal Growth despite Maximum Support

Sub Sector	Policies	Pub . Int & support	Output Growth rate % 2014-15 to 2018-19
Fishery	Little or no subsidy. No intervention of govt. FDI allowed. Some institutional support	Very low	7.45
Livestock	MMPO liberalised. No restrictions on private investments in milk plants. No market regulation. Co-op, Milk plant, private milkman procure from farmers directly. Aggregator. Little or no subsidy.	Very low	6.38
Fruits and Vegetables	No price support. Enjoy input subsidy. Regulated by APMC	Moderate	2.45
Cereals, oilseeds, pulses (MSP crops)	Heavily subsidised. MSP, Proc. Over regulated. APMC Act. Little corporate inv. in prod and mkg.	Very high	1.15

- More liberalised sector, higher the growth.
- Lesser govt intervention higher the growth
- Putting more resources in subsidies and support not leading to growth



Recent Initiatives for Agri. and Farmers

- **Pradhan Mantri Krishi Sinchai Yojana, E-NAM, Soil Health Card, PMFBY, Kisan Sampada Yojana: How working?**
- **Revision of norm for fixing MSP**
- **Public procurement expanded to more areas and commodities**
- **KCC for animal husbandry and fisheries.**
- **Interest subvention extended to dairy sector**
- **PM ASHA: PSS, PDP, Private Stockists Scheme**
- **Buffer stock for pulses**
- **PM Kisan Nidhi and State Initiatives for direct payment**
- **Reforms in agriculture**
- **AIF and FPO**
- **Export subsidy sugar, rice, wheat**
- **Oil palm promotion scheme**

How Much Agriculture Matters Now

- Share in GDP: 20 per cent
- Employment ~ 42 per cent. Welfare implications
- Inclusive character of agri growth
- Net foreign exchange earnings.
  - Export $41 Billion Import: $20 Billion
- Sustaining Food and nutrition security of 1.3 billion people
- Backward and forward linkages
- Social stability
- Savior from shocks
- Matters for Natural Resource Sustainability

Main Issues for Future

1. **Sustainability and ecology.**
    - **Water consumption ~ 80-90 per cent**
    - **Land under agriculture ~ 46 per cent**
    - **Green house gases ~ 17 per cent**
    - **Bio diversity loss**
2. **Serious concern about Climate change. Lot of talk about Nature positive, Regenerative agri.**
3. **Issue of farmers income – declining farm size. Scale issues**
4. **Rising cost, efficiency, and Global competitiveness**
5. **Food security, nutrition, safety and health**
6. **Growing opposition to modern methods of farming and use of chemicals in agriculture.**
7. **Food composition: Production and consumption imbalances**
8. **Alternative agriculture**
9. **SDG goals and Food systems transformation**
10. **Agri R&D and Technology for 21st Century**

Main Issues for Future….2

11. Support to startups coming with transformative ideas
12. Growth and sustainability tradeoffs
13. Excess workforce in agriculture. What is the way out
14. Paradigm shift in policy ecosystem: Centre and state
15. Lot of changes in food demand
16. Inter and intra Regional disparities
    - Programmes like aspirational district
17. Remunerative employment

Sustainability: Paradigm Shift in Approach
Agro-Climatic Regional Planning

- **Bringing back the forgotten concept**
  - **Shortage: used for production maximisation**
  - **Followed by indiscriminate push to production**
    - **Paddy in semi arid tropics**
    - **Ground nut in peak summer**
    - **Water intensive crops in low rainfall area**
  - **Dubious distinction of biggest exporter of embedded water**
    - **Exporting water intensive products and importing environment friendly**
- **Surplus: Can afford trade-offs in favour of sustainability**
  - **What does it imply**
    - **To balance environment health and economic profitability**
    - **Shift: from conflict with nature to comply with nature**
- **Unit of planning**
  - **Administrative point: district(s)**
  - **Agro climatic endowments: trans-boundary**
  - **Can be super imposed and delineated.**

Diversification to Achieve Multiple Goals

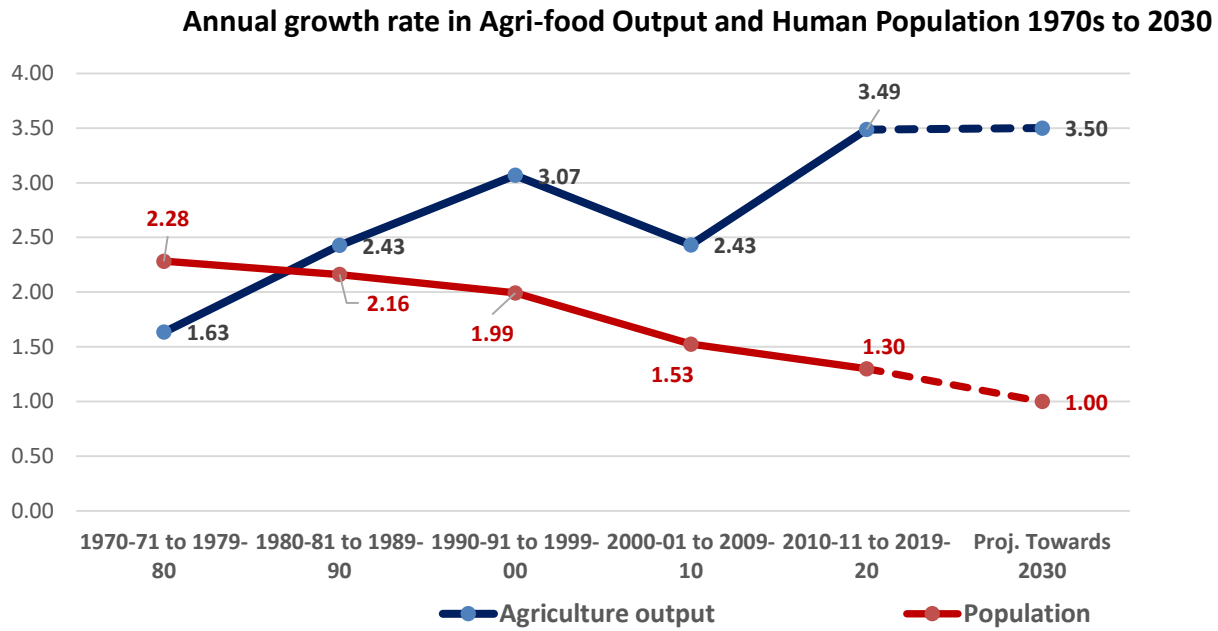
- Multiple goals: Match demand. Promote efficiency, better nutrition and health, sustainability and profitability. Export.
- Choices, Goals and pathways

Div towards	Main goal	Pathways
Nutri-cereals	Nutrition and sustainability	Tech, Price support, value chains
Pulses	Nutrition and sustainability. Import substitution	Upgrade technology, address market risk
Oilseeds	Improve self sufficiency.	Technology upgradation.
Horticulture	Profitability. Import substitution.	Processing, shelf life
Livestock	Regular and stable income.	Productivity, health, export
Medicinal and aromatic plants	Supplement income. Health. Export	Seed, Plant prop material. SHG/FPO mkg

- At district(s) level. Avoid glut. District diversification plan.
- Dovetail with various initiatives of Centre and states.

Prospects of Growth and Demand

- **No threat to meet future demand in medium term**



- **Proj. growth in output >3% and domestic demand 2-2.5%/year**
- **Need to export sizable quantity and compete in global market**
- **Growth turning costlier over time. Fiscally unsustainable, nature exploitative and environmentally suffocating. Must change.**
- **Problem of uneconomic surpluses and rising deficit of edible oil, pulses, nutra cereals.**

Fast Changes in Demand Pattern, and Dietary Divide

- Under nutrition, malnutrition. Health implications – deprivation and obesity co exist
- Emphasis on food for health will increase
- Globalisation of diets and also demand for ethnic food
- Superior and inferior cereals def may be reversed
- Dietary divide:
  - Food for elite: Organic, natural, exotic
    - Different type of value chains. Labeling, Traceability
  - Food for masses
- Quality, safe, healthy and attribute based food

Food processing and agro based industry

- **Food processing and agro based industry**
  - **Demand shift towards processed, ready made food. Value addition. Job creation.**
  - **MSME: Packaged products, ethnic and traditional food.**
  - **Several new initiatives esp. under *Atma Nirbhar Bharat*:**
    - **PM-FME (Formalisation of Micro Food Proc Enterprises). One district one product. Existing and new micro food processing unit**
    - **Prod Linked Incentive Scheme in 10 key sectors, including food processing**
- **Pradhan Mantri Kisan SAMPADA Yojana (PMKSY)**
  - **1. Mega Food Parks,**
  - **2. Integrated Cold Chain and Value Addition infrastructure**
  - **3. Infrastructure for Agro-processing Clusters,**
  - **4. Creation of Backward and Forward Linkages**
  - **5. Creation/ Expansion of Food Processing & Preservation Capacities**
  - **6. Operation Greens**
- ***Competition among districts for above***

Required New Pathways

- Costly growth to efficient growth
- Balancing interest of future and present generation
  - sustainable use of natural resources
- Supply driven growth to demand driven growth
- Food security to nutrition security and health
- Unregulated food to safe and healthy food
- Enabling farmers to become price setter: Farmers org
- Overcome scale disadvantage: making small stronger
- Matching willingness to pay with willingness to supply
- Attract modern capital and knowledge to agriculture
- Attracting technology start-ups to agriculture
- Linking production to processing for job creation
- Dependent agriculture to self reliant agriculture
- Balancing need with capacity

"What farmers deserve and seek v/s what nation can afford and pay"

Some Messages for NARS

- **Reprioritise and reallocate resources and manpower over commodities, themes and space based on future scenario.**
- **Redefine goal of research.**
  - **Wider adaptation, to, agro climatic based productivity**
  - **Yield maximization, to, minimization of average cost/unit of output**
  - **Crop duration: do not enable crop intensity beyond sustainable limit.**
  - **Examine food system approach; is it possible to change research portfolio as envisaged in FS approach**
  - **High priority to agro forestry with cropping system**
- **Precision farming and new tools of science**
  - **Strong in biotechnology. Collaborate with IIT etc for space, digital, design, drone, mechanization, post harvest, waste to wealth, hi-tech agri**
- **More active involvement with private sector**

Thank you!