



RESEARCH
PROGRAM ON
Agriculture for
Nutrition
and Health

Led by IFPRI

The Agriculture Nutrition Disconnect in India: A look through policies and programs

By **Devesh Roy**

**Refresher Course in Human Rights & Social Inclusion
(ID)**

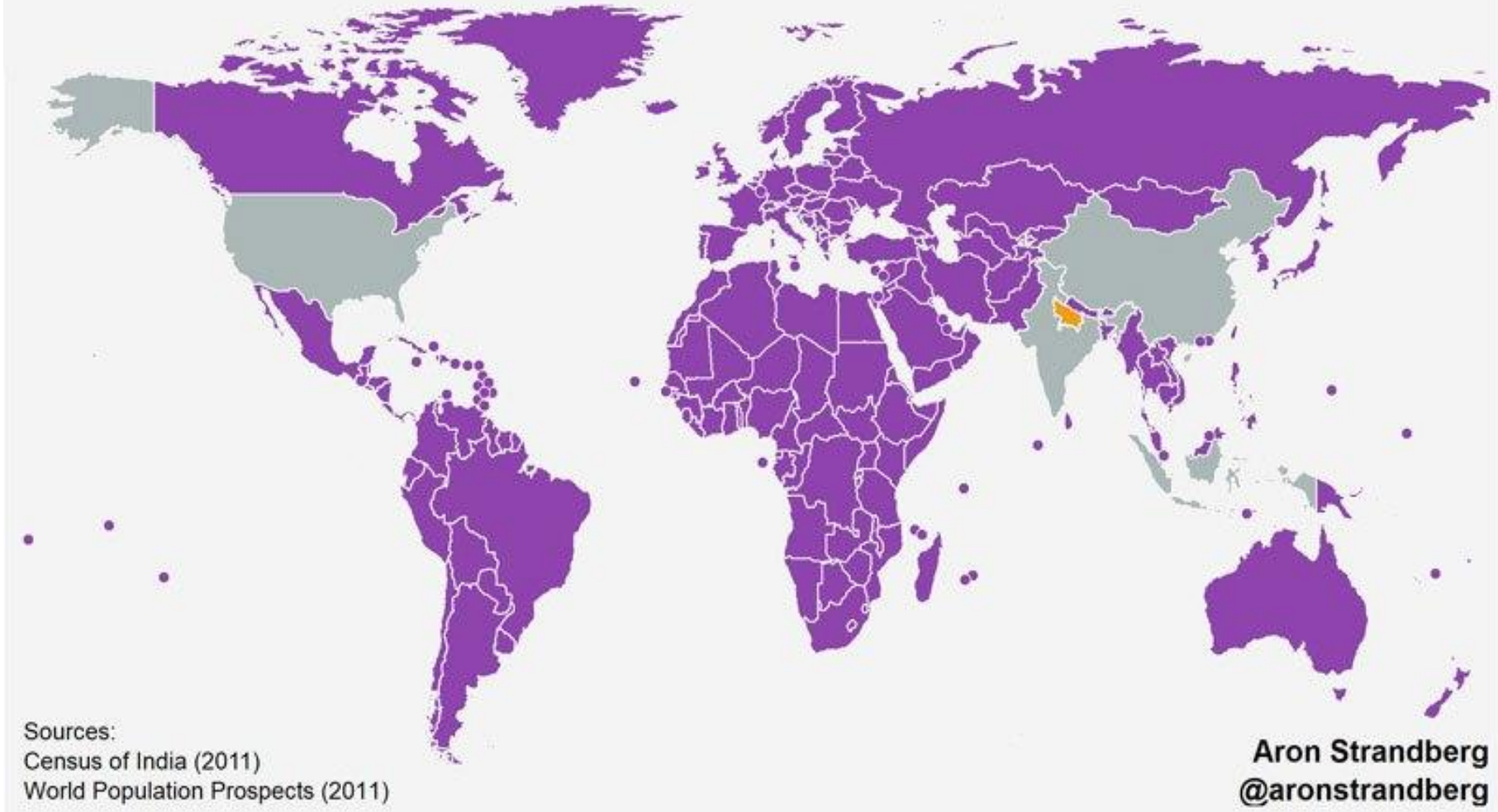
UGC-Human Resource Development Centre, Jamia
Millia Islamia (New Delhi)



An order of Magnitude Problem in India

- 17% of world population
- 2.4 % of the land
- 4% of the Water Resources
- 1.3 bn population
- 28 states and 9 UTs with different social, economic, cultural, political and food environments with significant rural urban variations

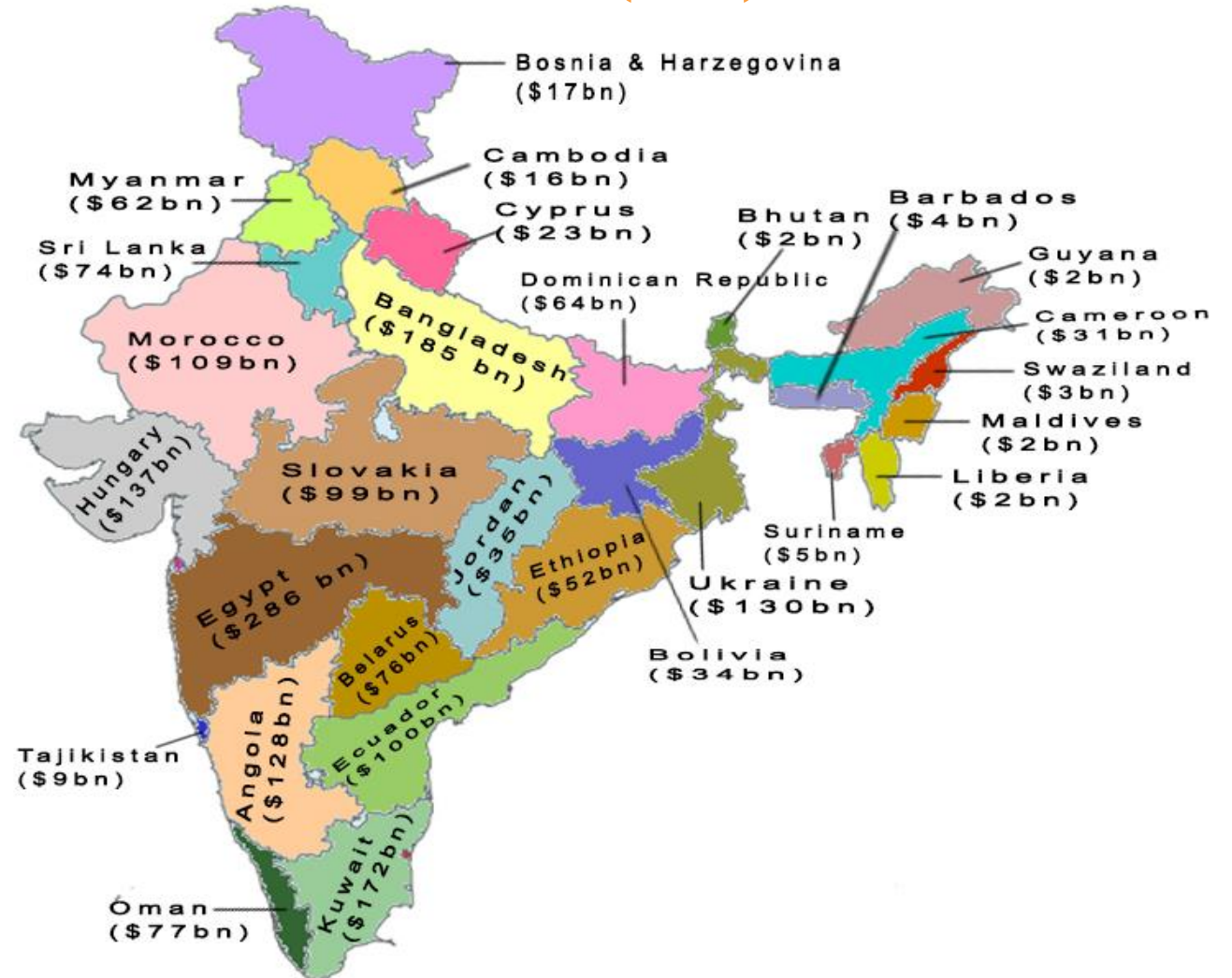
Countries with a smaller population than Uttar Pradesh



Looking from a Comparative Lens

- If Uttar Pradesh were a country, it would be fifth most populous country
- Yet its economy would only be size of Qatar, tiny oil-rich state of < 2m people.
- UP GDP per capita is close to Kenya.
- If Maharashtra were a country, 38th largest economy in world- California of India >Egypt's GDP of \$286 billion and higher than \$250 billion of Pakistan.
- “The frustrating thing about India” -Joan Robinson, “is that whatever you can rightly say about India, the opposite is also true.

Indian States Renamed for Countries with Similar GDP (2014)



SOURCES

- International Monetary Fund, 2015 report
- Ministry of Statistics and Programme Implementation, Govt. of India

The Landscape in India



- Despite historically high food production, undernutrition & micronutrient deficiencies persist.
- At present, 22.5% adults are underweight, and 38% stunted.
- While undernutrition persists, based on latest NFHS-4, >20% Indians overweight or obese.
- India joins many other countries in grappling with the double burden of malnutrition.
- Overweight and obesity rates have doubled over the past decade in all Indian states, registering rapid growth in both rural and urban areas.
- Women are more likely to be overweight or obese than men, especially those living in urban areas.

Understanding the problem

- To understand the causes of this problem, we need to look at people's diets,
 - where they are eating, what they are eating, what is produced and how this has evolved over time.
- Diets in India are traditionally cereal-based and usually lack diversity.
- These dietary practices coupled with food insecurity led to high levels of under-nutrition and widespread micronutrient deficiencies.
- As production of food and access improved, issue transitioned from being one of food security to nutrition.
- Need to improve diversity of Indian diets as reliance primarily on cereals for energy may lead to macro nutrient over-nutrition coupled with micro-nutrient deficiencies arising from the lack of diversity in the diet which is reflected in the rising levels of obesity.
- Another factor that contributes to the multiple burdens of malnutrition, is the increased availability and higher consumption of highly processed and packaged food rich in carbohydrates, fats, sugar and salt, increased levels of eating out and snacking. The following are salient in India's dietary transition, according to the 68th and other rounds of the National Sample Survey:
 - Decline in consumption of coarse cereals
 - Rising consumption of meat, salt, and fat
 - Rising rates of eating out, or away from the home
 - Sharp increases in consumption of snacks
- Considering SDG 2: End Hunger and Achieve Food Security and Improved Nutrition, it is imperative to support the production and availability of, and accessibility to, a nutritious diet for the Indian population.

Factors behind the changes



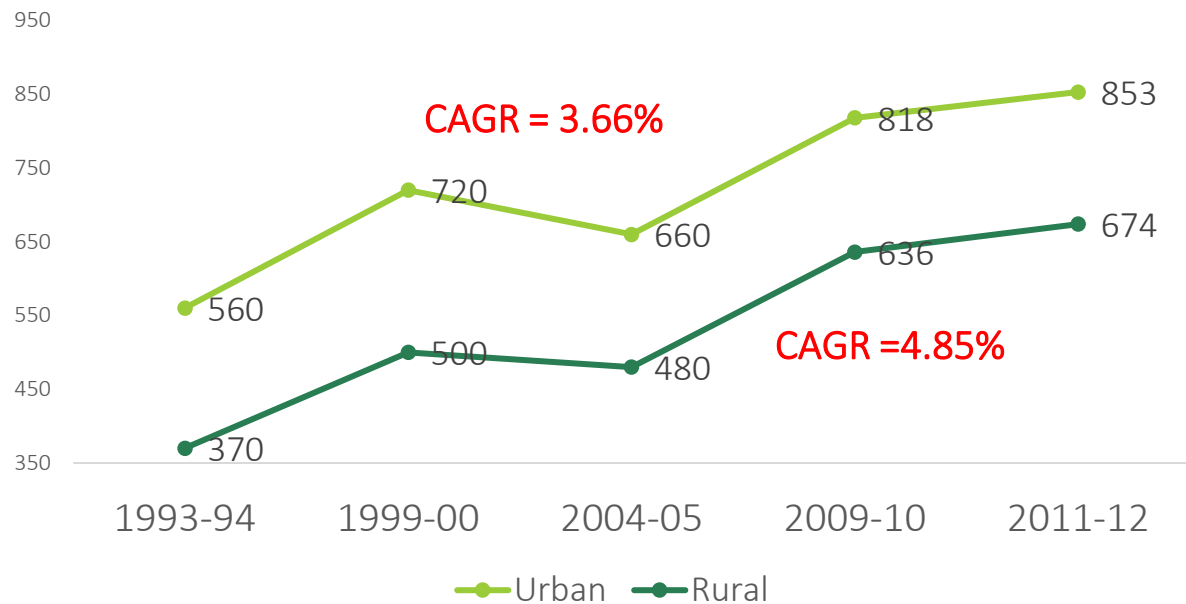
- Dietary changes are occurring alongside increases in wealth and sedentary lifestyles.
- If left unchecked, these trends will result in an increased disease burden for the country.
- India has a high burden of undernutrition and infectious diseases, and now with rising levels of overweight and obesity and DR-NCDs, it becomes critical to pay attention to the entire spectrum of malnutrition.
- Policies and programs are needed to address the underlying determinants of anaemia, stunting, wasting, and underweight, but to also face the challenge of overweight and obesity in both children and adults.

Centrality of diets and nutrition

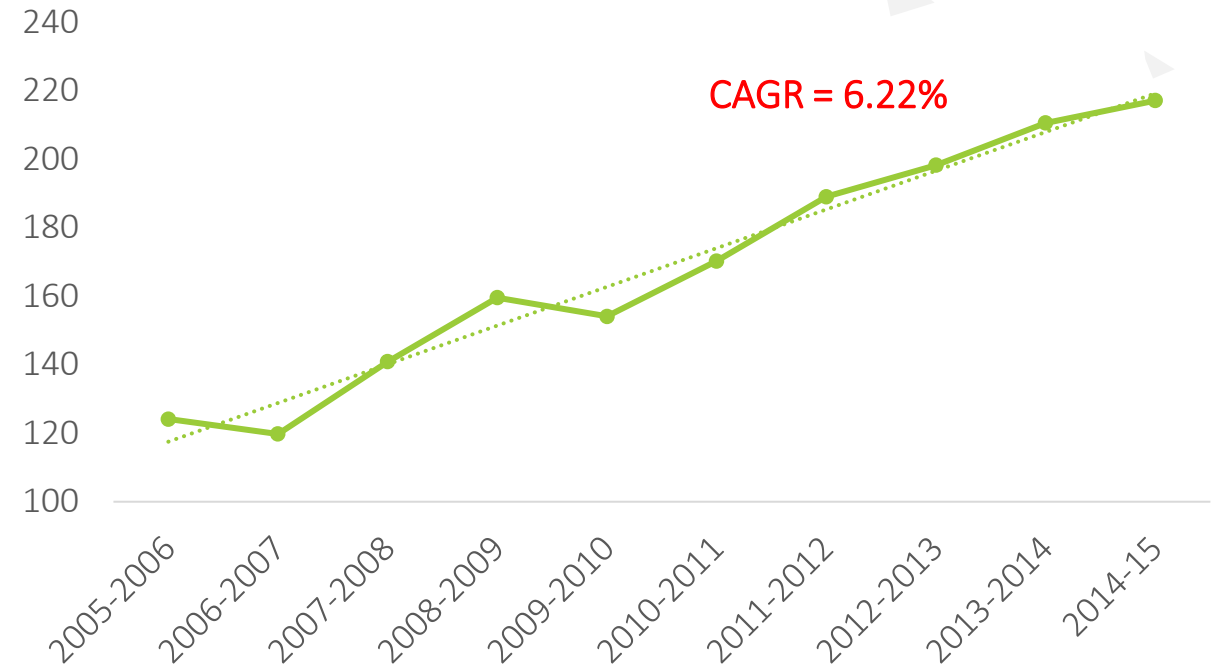
- The centrality of nutrition for better health outcomes is well recognized.
- The nutritional status of individuals, families, and communities depends on the food they consume. This is in turn determined by the availability, acceptability, and affordability of food. Thus, improving the health of the people requires improving their nutrition through better and more nutritious food.
- This is where agriculture plays an important role not only as a means of producing diverse, nutritious, safer food that is affordable but also through pathways like improved household access to nutritious food, improved income, women's empowerment (see [Leveraging Agriculture for Nutrition in South Asia](#) for more information on these pathways in India).
- Efforts to improve nutritional outcomes should be placed in the larger context of a food system, that is, the full set of actors, processes, and activities involved in getting food from where it is grown to those who will eat it.

Rising consumption of edible oil

Monthly per capita consumption of edible oil (in grams)



Domestic Availability of Edible Oil (lakh tons)



- Big gap between total household consumption of edible oil and domestic availability
- Food system intervention of making the imports of edible oils freer since 1992 played a pivotal role
- At least a part of this gap would be accounted for by food consumed outside and consumption of packaged foods, including snacks





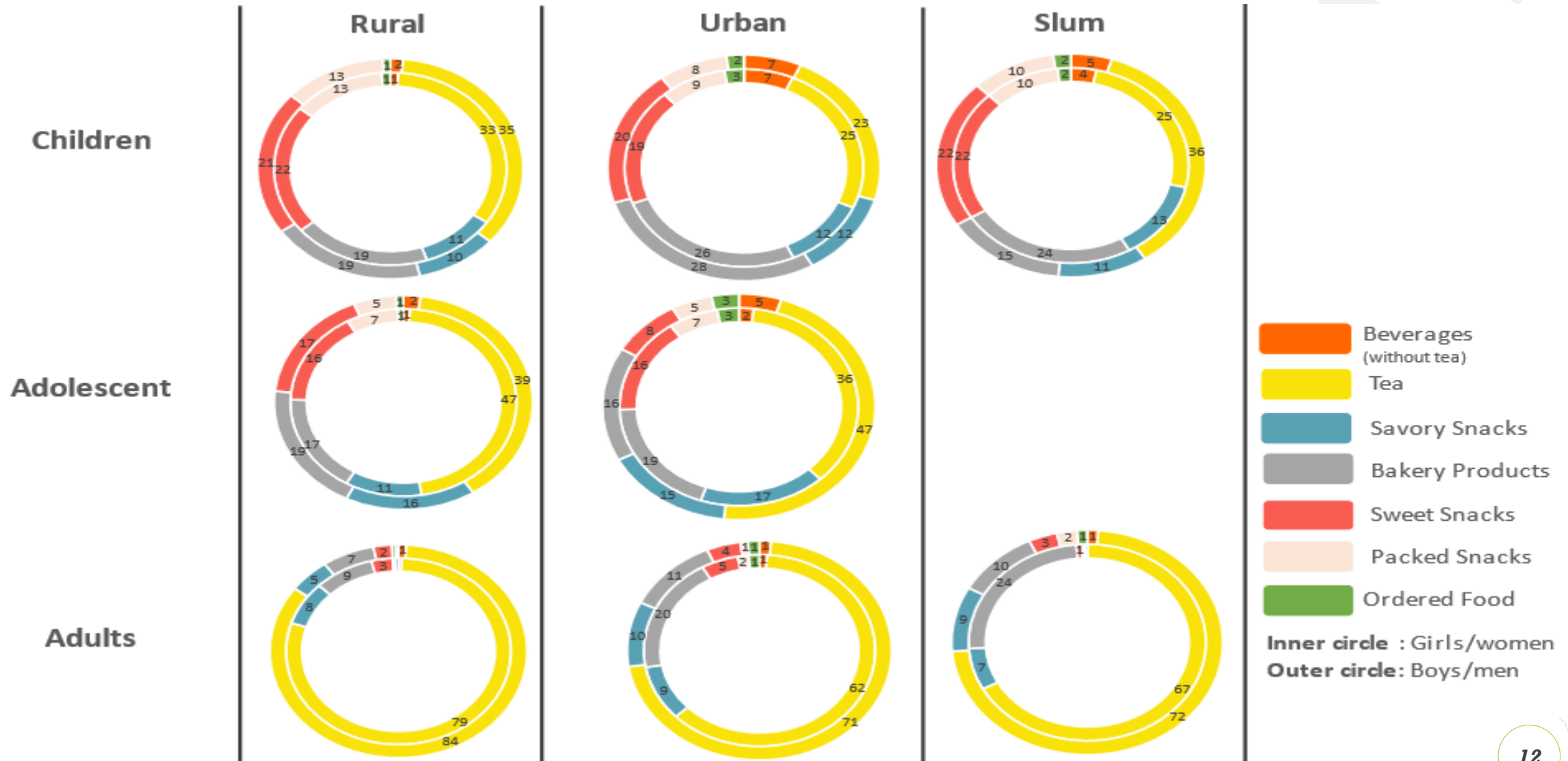
On to other elements of food environment: asymmetric food access- From food desert to nutrient desert



Food deserts to nutrient deserts

- Long characterized by food deserts owing to persistent food scarcity, such as insufficient cereals to meet calorific needs, the situation in several regions in India is fast turning into one of nutrient deserts.
- In India, obesogenic foods such as snack foods are getting to places that fresh and nutrient-rich foods are not.
- The interdependence of geographic access to food and the consumption of adequate and healthier diet is not well understood generally, but particularly in India.
- Unhealthy diets are crowding out healthy ones, yet without access to healthy choices, consumers sometimes have no alternatives.
- How can farmers, transporters, regulators and market actors work together to widen the reach of nutritious and healthier foods?

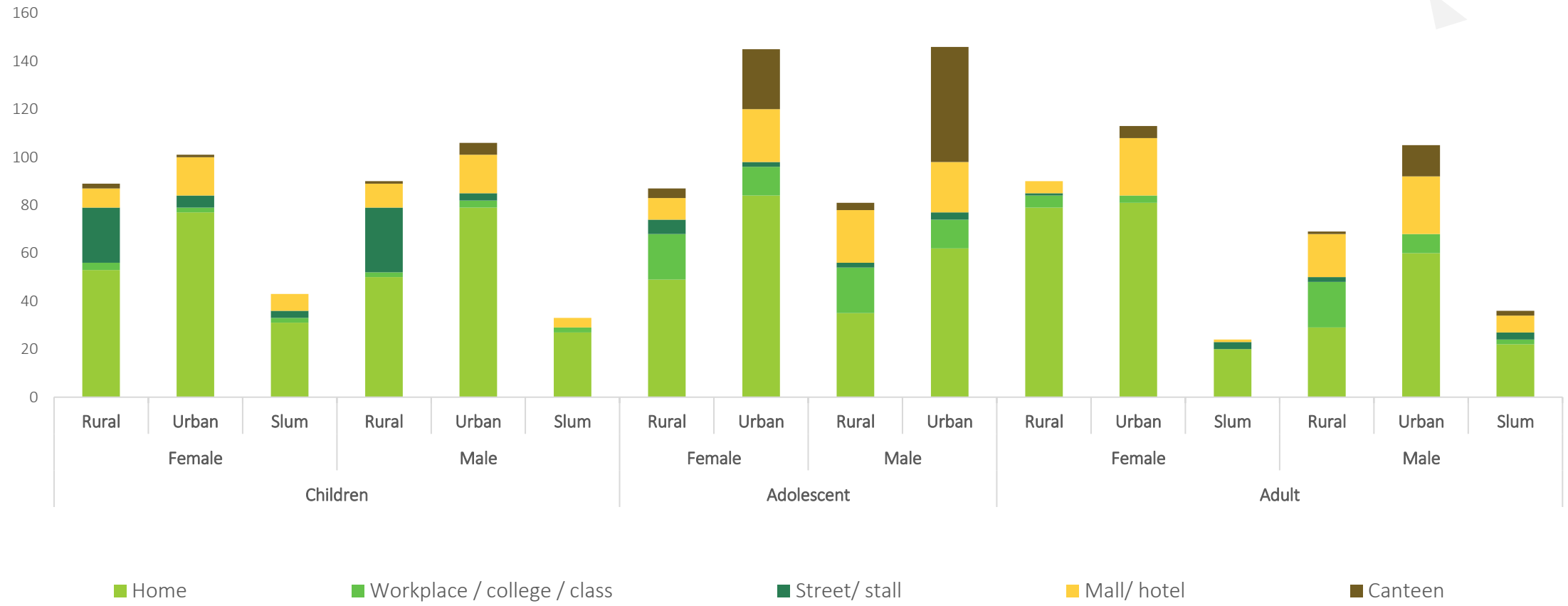
Snack food consumption – The Pune transect



Snacking occasions



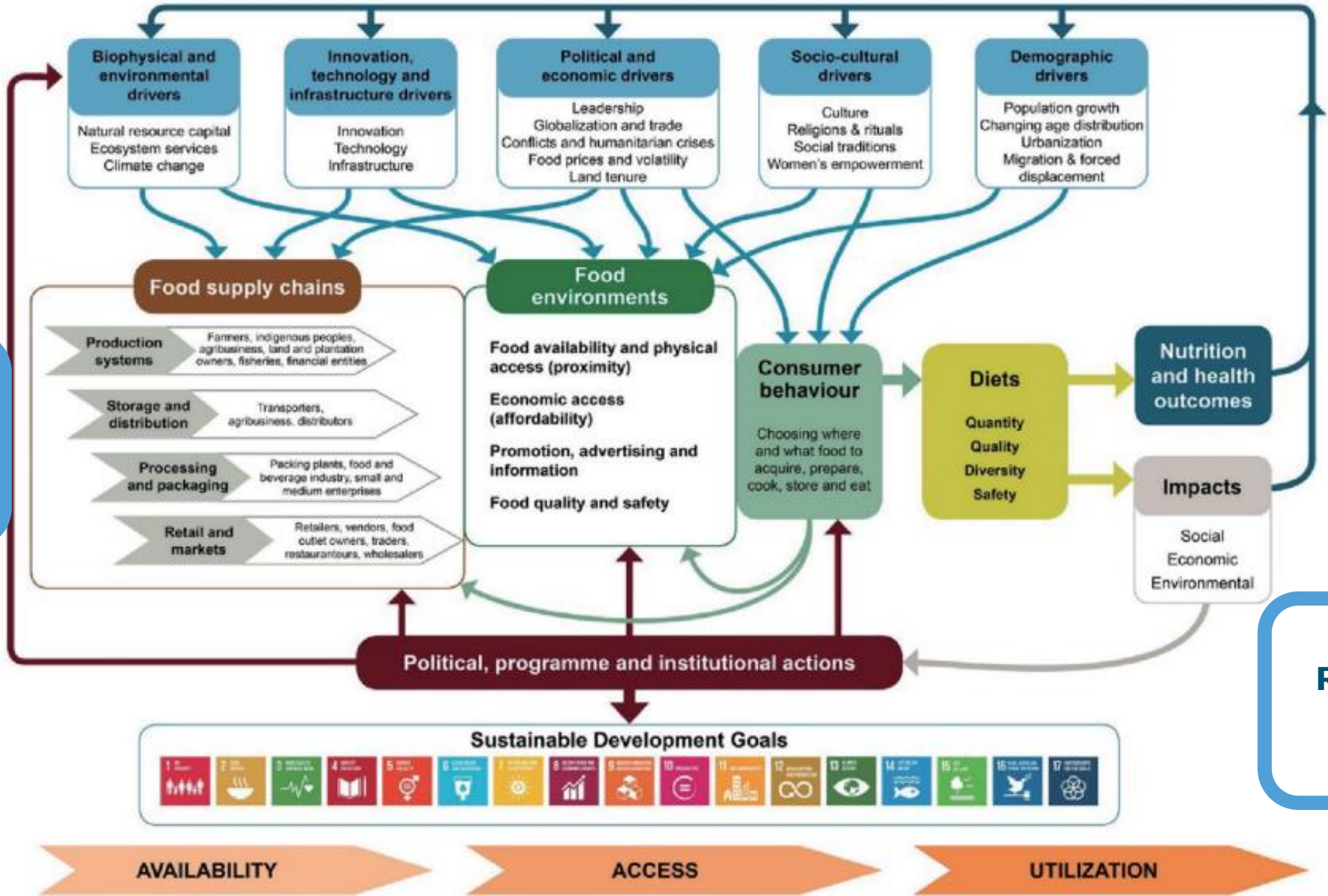
Places to Snack (frequency in %)



An order of Magnitude Problem in India

DRIVERS

COMPONENTS

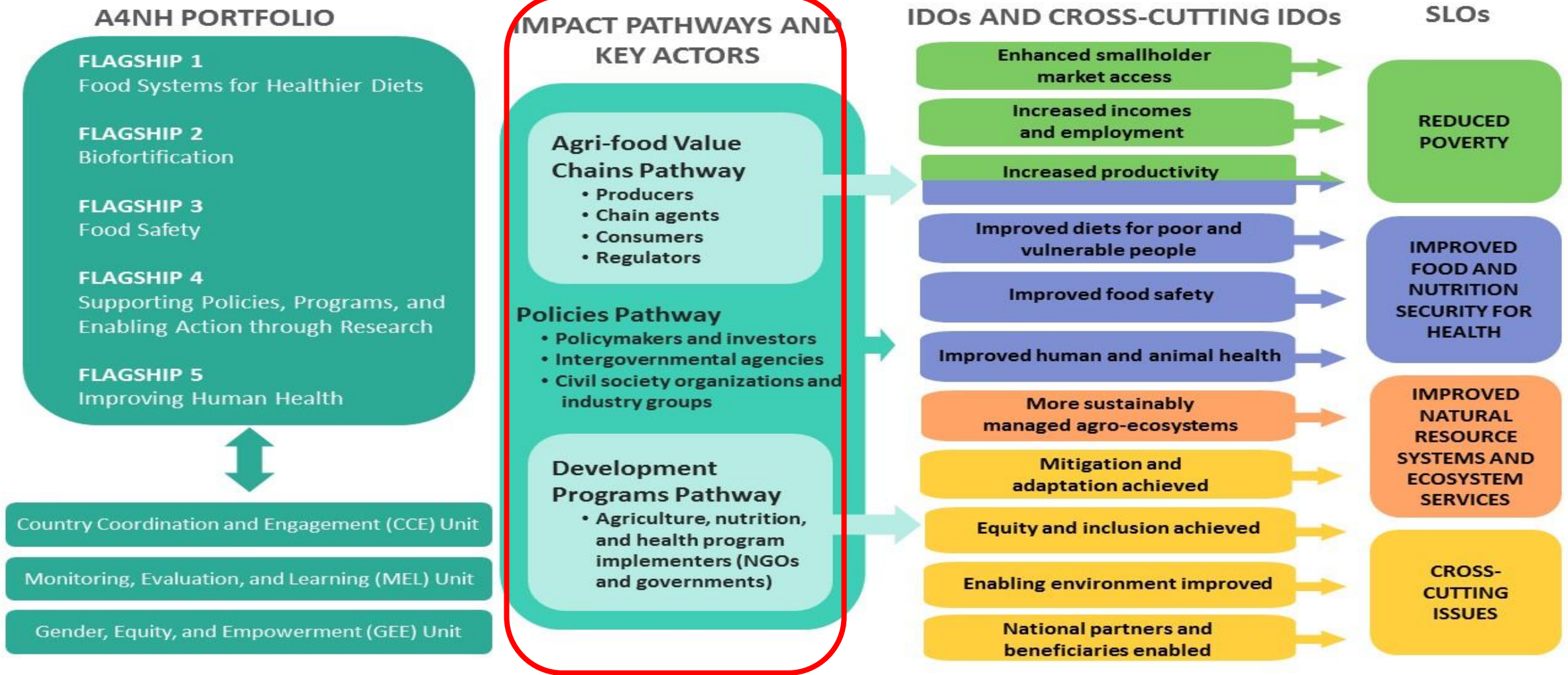


RESULTS

Agriculture nutrition pathway: the food system imperative

- Strengthening the agriculture-nutrition pathway when considering food system development in India will be key to addressing these challenges. Critical components include:
 - Ensuring agriculture is represented in national nutrition policy,
 - Creating market-based solutions for producers with incentives aligned with choices of nutrition-dense products,
 - Creating incentives for consumers through price and non-price mechanisms, and
 - Addressing safety and other issues along the value chains for healthy, fresh foods.
- It is thus important to adopt a systems approach while determining the interventions to improve the nutrition and health outcomes of the population. Implementing this food system approach to ensure availability of more nutritious, safer, and affordable diets presents challenges.
- Sheer expanse of the food system that includes farmers (who are overwhelmingly smallholders); their choice of crops; post-production issues; supply chain management; unorganized food processing systems; informal food value chains; and social, economic, and cultural aspects of dietary habits
- Requires a deep micro- and macro-level understanding of the Indian food system to make policy decisions.

Impact Pathways



- A **sustainable Food System** is a FS that embraces all elements and delivers food and nutrition security for all in a way that food security and nutrition for future generations are not compromised.

Changes since the Green Revolution: some stylized facts



- Increases in per capita income
- Urbanization
- Population growth, age composition and extremely small landholdings
- Poverty reduction uneven
- Food demand- could changing demand lead to greater GHGs (livestock) and worsened soil.

New emerging realities of undernutrition and over nutrition- Emerging challenges- India sitting on a volcano of diabetes – NY times

Since 1990, % of overweight/obese children & adults tripled to 18.8% from 6.4% . A big laboratory or set of laboratories for social safety net – extremely large natural experiments happening- footprints in food system large and diverse

- **Climate change**
- Earlier focus on food has been on producing more to feed growing population Then managing consumption through policies and programs. They have not looked at it as a system.

Pulse and oilseeds story tells a lot

Cereal dominated in policy and perverse non-cereal focus in markets

Incentives to farmers to respond to market signals?

NAM, GST, FSSAI

Large footprints of social programs

Healthier Diets (Sharma et al 2020)

- 2019 EAT-Lancet Commission report recommends healthy diets that can feed 10 billion people by 2050 from environmentally sustainable food systems.
- Sharma et al (2020) compare food consumption patterns in India, across income groups, regions, sectors (rural/urban), with EAT-Lancet reference diet and highlights deviations.
- Average daily calorie consumption in India <recommended 2503 kcal/capita/day across all groups compared, except for richest 5%.
- Calorie share of whole grains significantly higher than EAT-Lancet recommendations while those of fruits, vegetables, legumes, meat, fish and eggs significantly lower.
- Share of calories from protein sources only 6–8% compared to 29% in reference diet.
- Imbalance highest for households in lowest decile of consumption expenditure, but even richest households in India do not consume adequate amounts of fruits, vegetables and non-cereal proteins in their diets.
- An average Indian household consumes more calories from processed foods than fruits and consume more cereals than fruits and vegetables.

Healthier Diets: Disaggregated level for

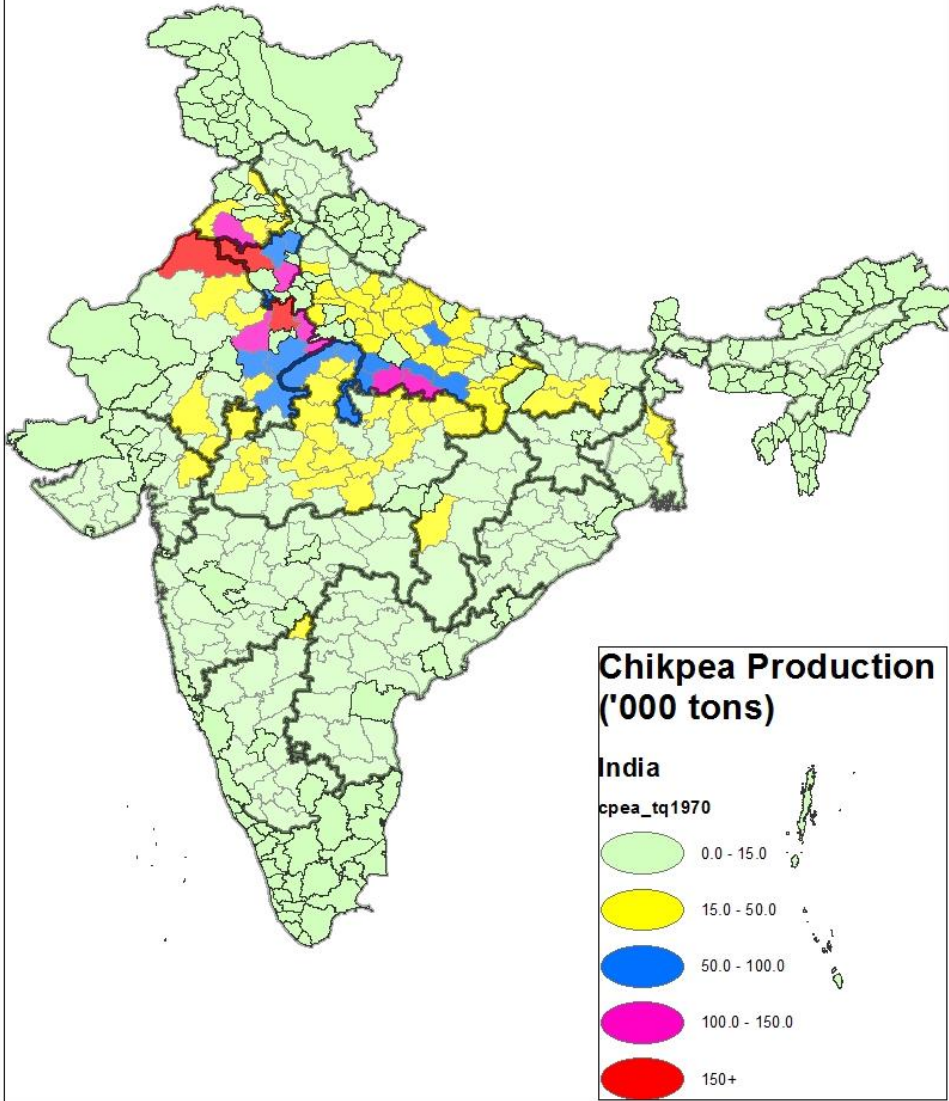
- Indians get fewer calories from added fats than recommended in reference diet despite increase of 3.5% in consumption of oils and fats (1993-94 to 2011-12).
- Consumption of healthier oils & fats less and of unhealthier saturated fats like palm oil higher. high in unhealthy saturated fat and chief ingredient of vanaspati (partially hydrogenated vegetable oil).
- Consumption of vanaspati rose by 51% between 1993-94 & 2011–12 -widely used for cooking at home, in restaurants, by street vendors, and in preparation of processed foods.
- Highest caloric consumption of palm oil is among highest income groups. Consumption highest in western India.
- Urban households in highest income group get 30% of daily calories from processed food. calorie share of processed food highest in Southern India and lowest in North-Eastern & Northern India
- **Indian diets, across states and income groups, are unhealthy.**
- **Indian policymakers need to accelerate food-system-wide efforts to make healthier and sustainable diets more affordable, accessible and acceptable (food quality and safety).**

Changes in India's food system needed

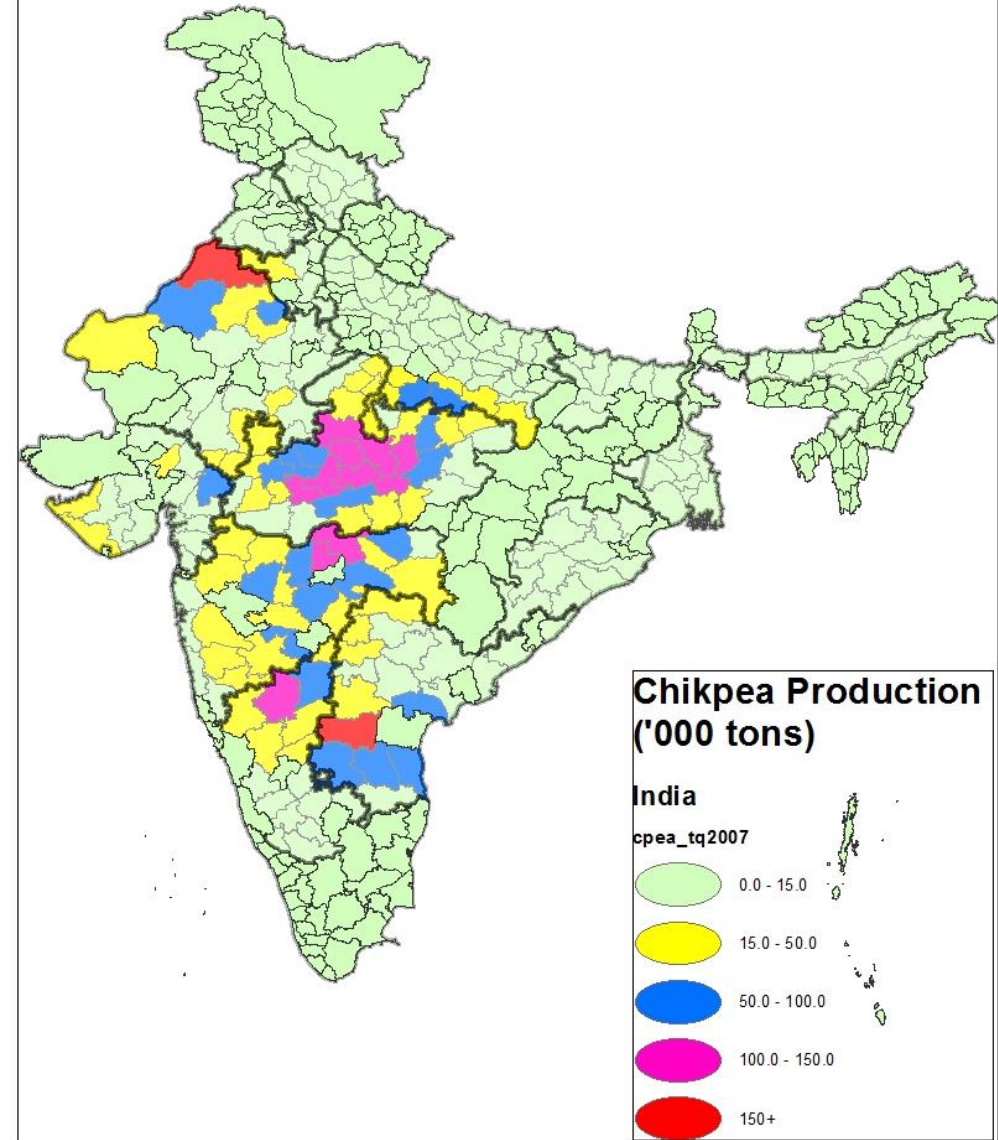
- Shift to healthier diets will also require a change in production patterns.
- Would require changes in food environment
- Currently, produce too much rice, sugarcane, too little coarse cereals, pulses, fruits & vegetables.
- Rice & sugarcane highly water intensive. Wet rice fields emit methane, powerful GHG.
- Rice farmers burn residues-- (carbon dioxide & particulate matter (schott et al IJE 2019)).
- Shifting cropping to coarse cereals & pulses--make food systems healthier & sustainable.
- It also requires agriculture, trade, and consumer awareness policies that can address the accessibility, acceptability, and affordability of healthier dietary options.



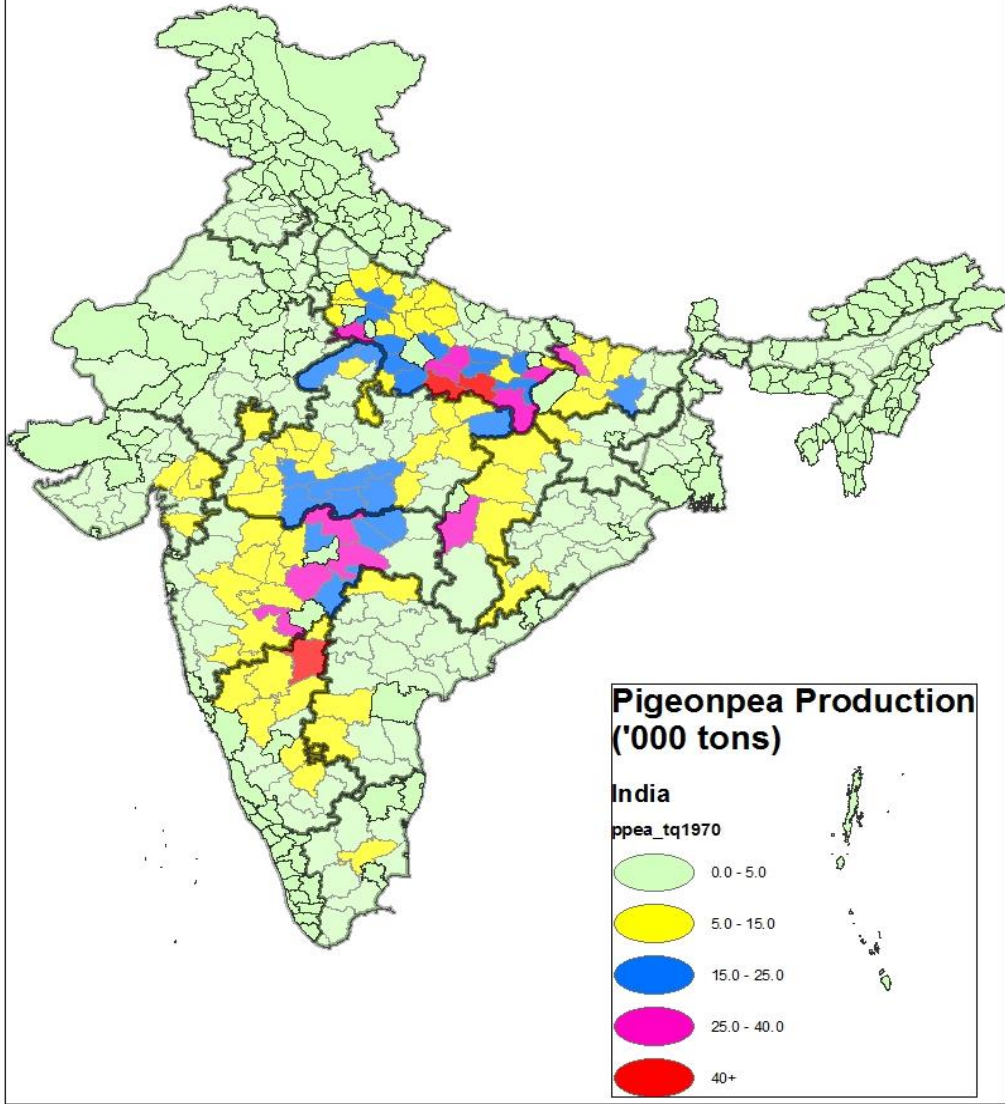
Chikpea Production ('000 tons) in 1970



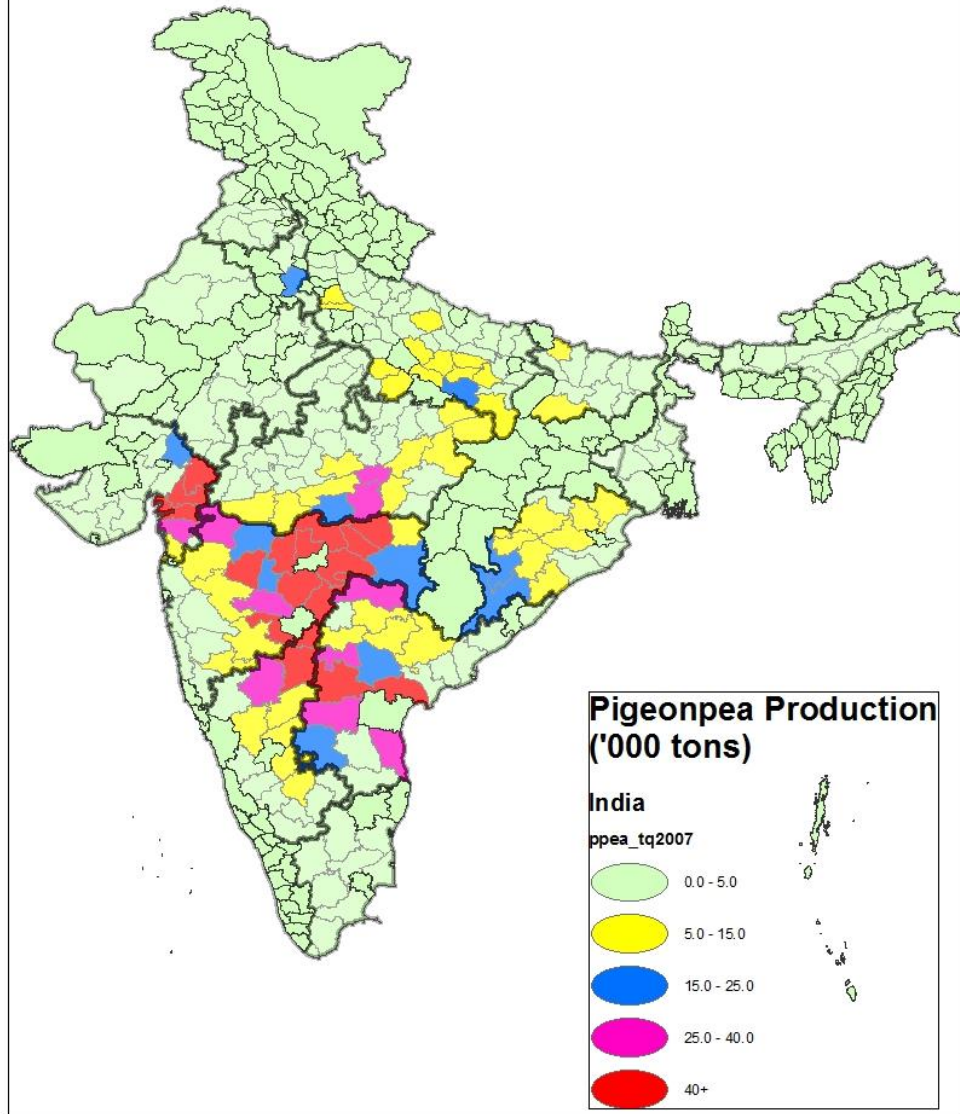
Chikpea Production ('000 tons) in 2007



Pigeonpea Production ('000 tons) in 1970



Pigeonpea Production ('000 tons) in 2007



Results from supply response analysis in pulses

- Price factors do not account for supply response- Non price factors like rainfall significant
- Issue of risk premium precluding response to prices. Is the supply curve vertical? - probably piece wise vertical - beyond a threshold price change it is upward sloping. Big price increases needed to overcome risk
- Is it intensification rather than acreage?
- Calls also for better transmission
- Can MSP work? Do they cover risk- are changes in MSP countercyclical?



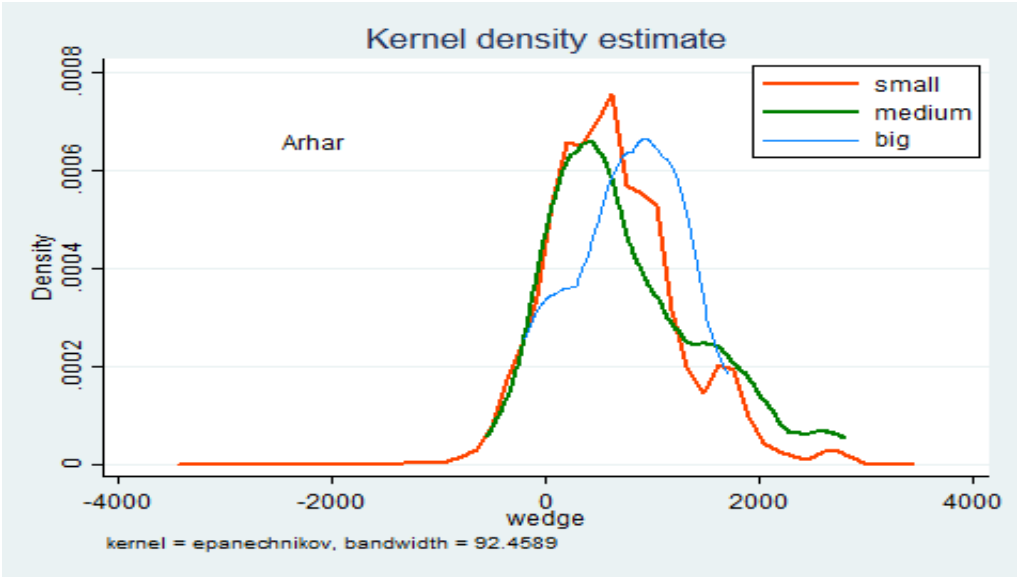
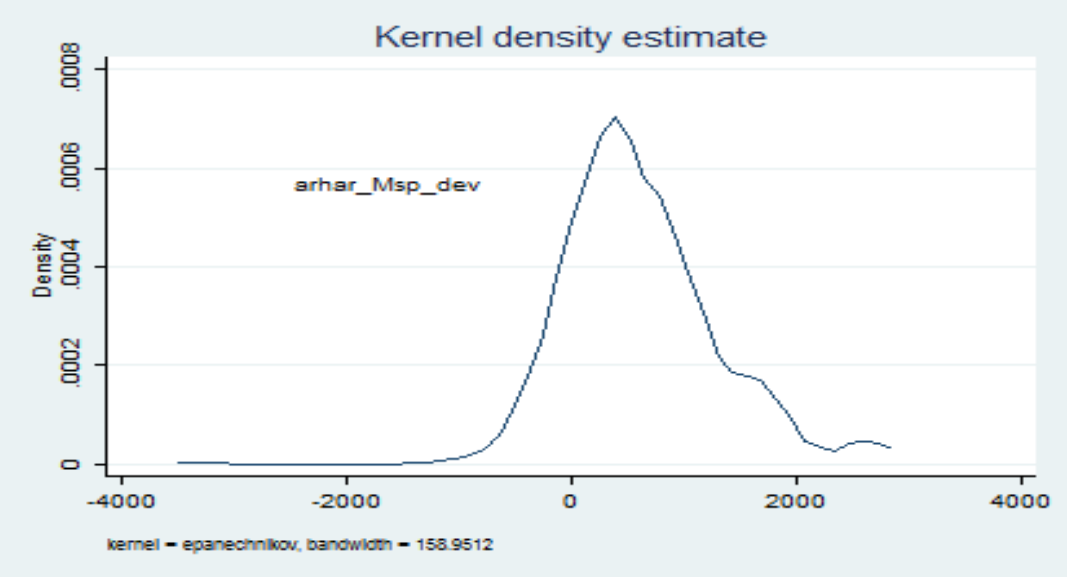
MSP and farmer prices for crops like pulses and oilseeds- Deficit crops, deficit regions



- Requires fundamentally different approach to achieving supply increase.
- MSP without procurement can have perverse effects: Paradoxically farmers can even be worse off relative to counterfactual of no MSP announcement
- a possible coordination problem when traders attempt to collude. Here, a price floor such as MSP can serve as a focal point on which traders coordinate.
- We argue that implicit price floor because of MSP can facilitate tacit collusion and lead to lower prices anchored around the MSP
- If MSP were binding as a floor price it would affect the demand of the traders i.e. if it is above the market clearing price in the exchange between traders and farmers



Farm gate prices and MSP in case of pulses

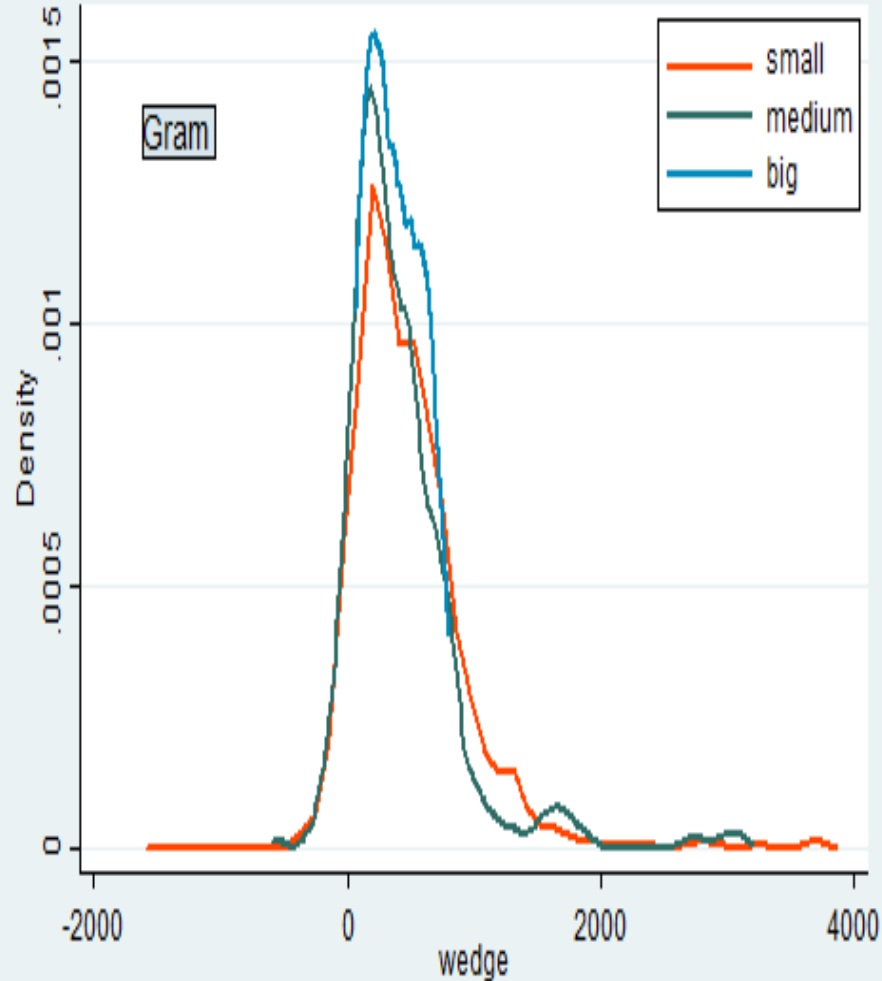


Main data source - CACP

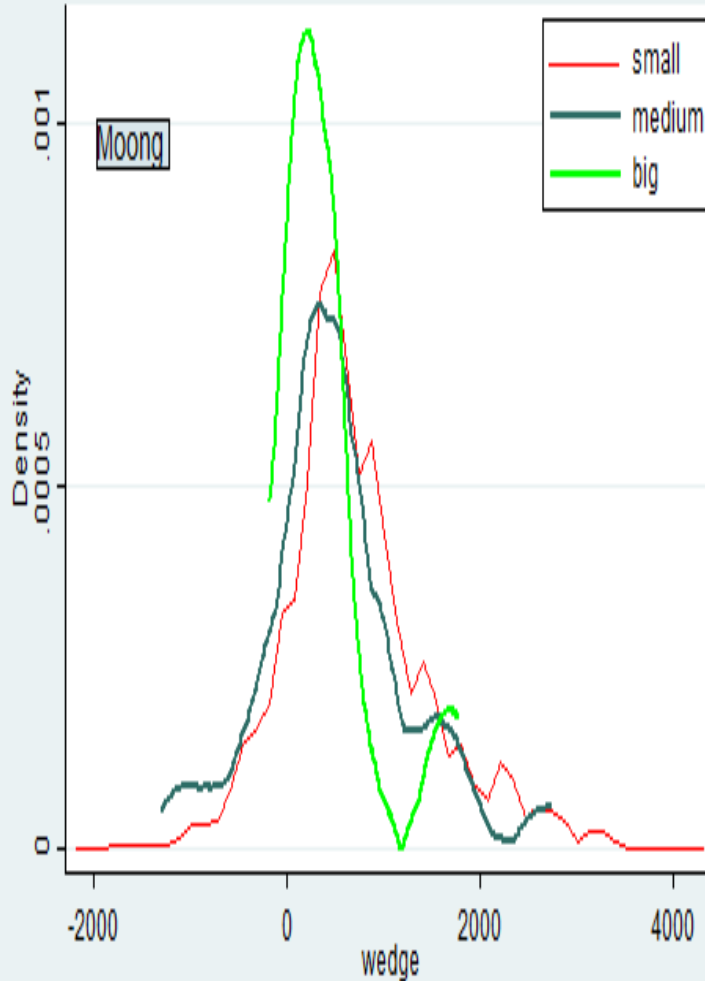


Farm gate prices vis-à-vis MSP by pulse type

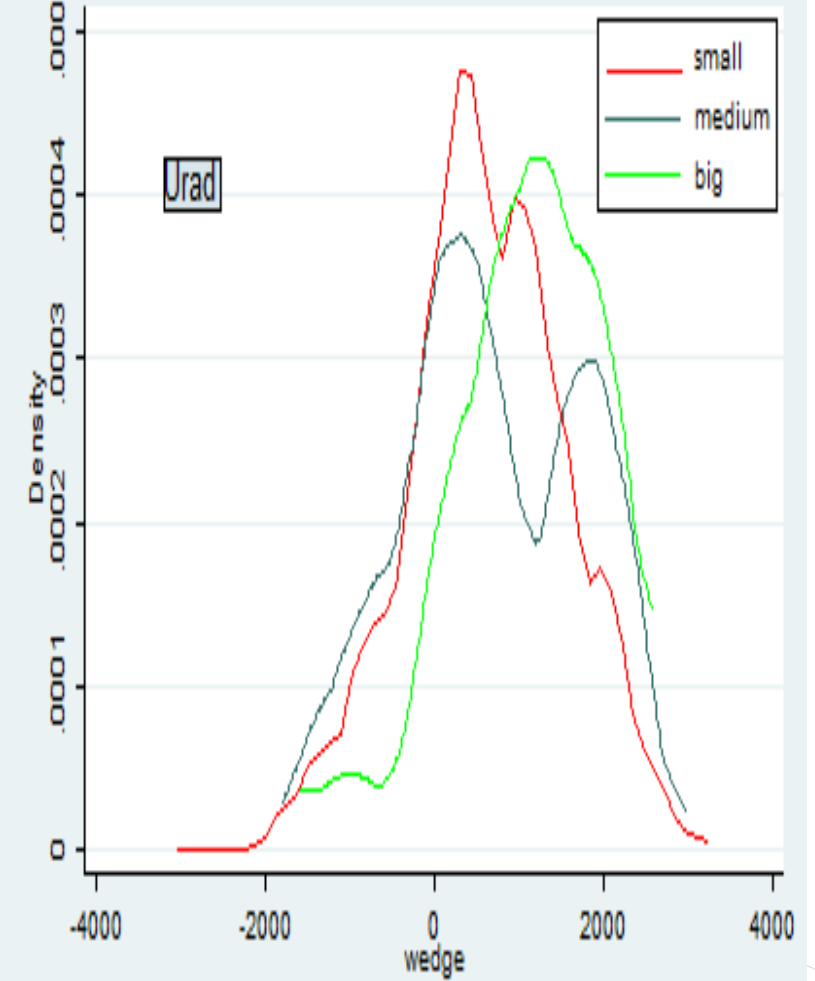
Kernel density estimate



Kernel density estimate



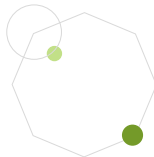
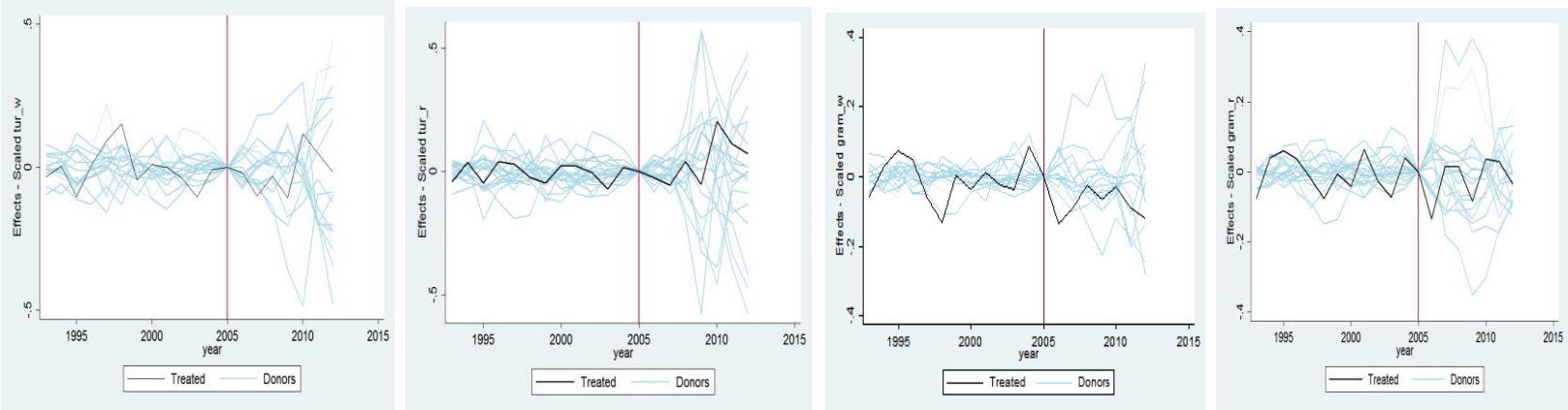
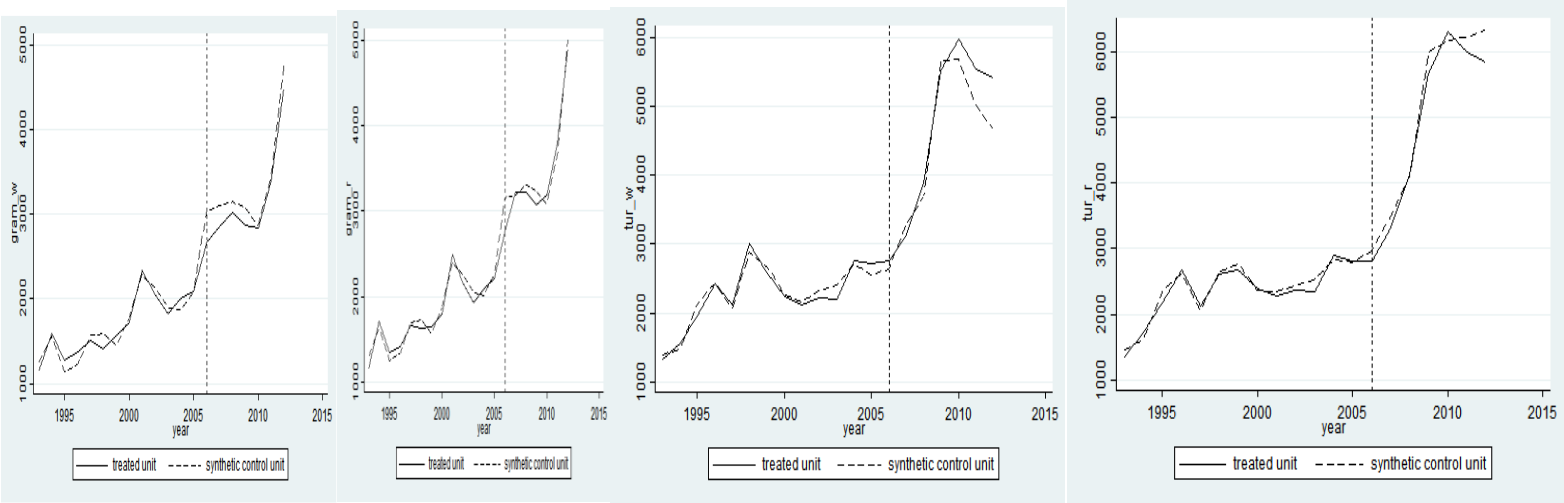
Kernel density estimate



- Now what should one expect from a policy move like repeal of APMC in Bihar

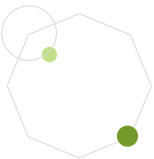
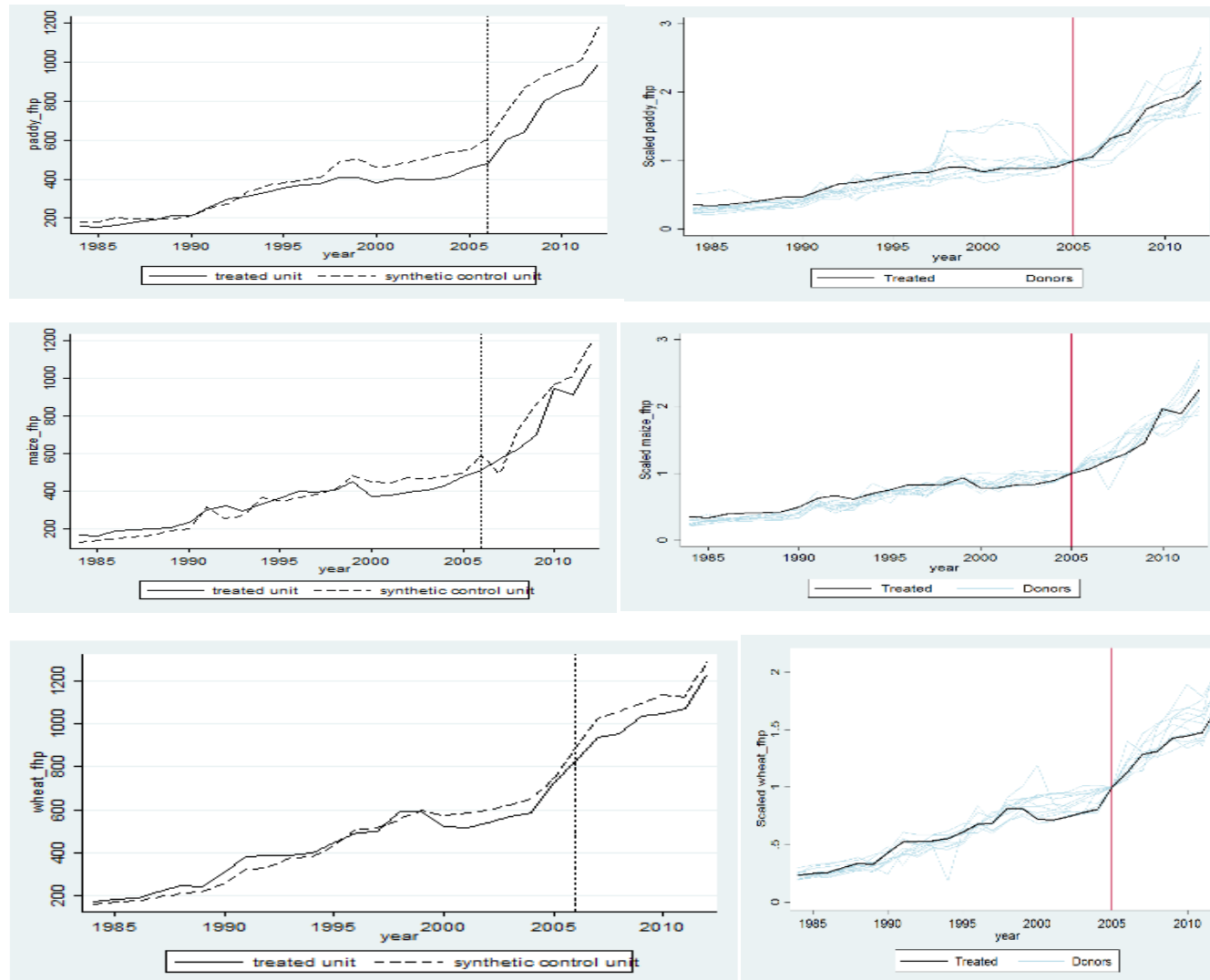
SCM estimates (pulses)

Figure 1: SCM estimates for wholesale and retail price of pulses



SCM estimates paddy, wheat and maize

Figure 1: SCM estimates of price impacts of paddy, wheat, and maize



Bihar abolished the APMA Act in 2006

- Abolishing the Agricultural Product Marketing Act (APMA) was one of the first acts of the Nitish Kumar Government in 2005
 - The first state in India to abolish the APMA [J&K, Kerala, Manipur never had it]
- APMCs were to be replaced with new markets through a PPP model
 - To link 1500 *haats/baazars* with secondary & terminal markets
 - ADB supported the preparation of DPRs
- But the PPP model was never implemented
 - Government was hesitant to lease public land of mandi yards to Private Companies



APMC mandis never functioned as envisioned in Bihar

- Open auctions were uncommon
 - Also true for other states
- Few farmers on the mandi boards and weak PACS
 - Weak PACS are a major reason for poor public procurement @ MSP in Bihar
- Private market yards functioned even before the repeal of the APMCs
 - But now there was no need for bribes to bypass the APMC mandis
 - Same experience in Odisha too after delisting of fruits & vegetables from the Act



The abolition of APMCs received little farmer attention

- APMCs had long been dysfunctional
- Few farmers in Bihar sell their produce in Mandis
 - >90% of sales at farmgate [SASF, 2012-13; Chatterjee, Krishnamurthy & Kapoor, 2020]
 - In spot transactions. Borrowing from traders is uncommon in Bihar
 - Factor markets are more interlocked in Punjab and Haryana than Bihar
- State received little revenue from markets
 - *Rangdaari* > taxes/fees

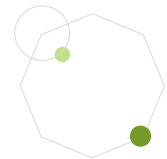
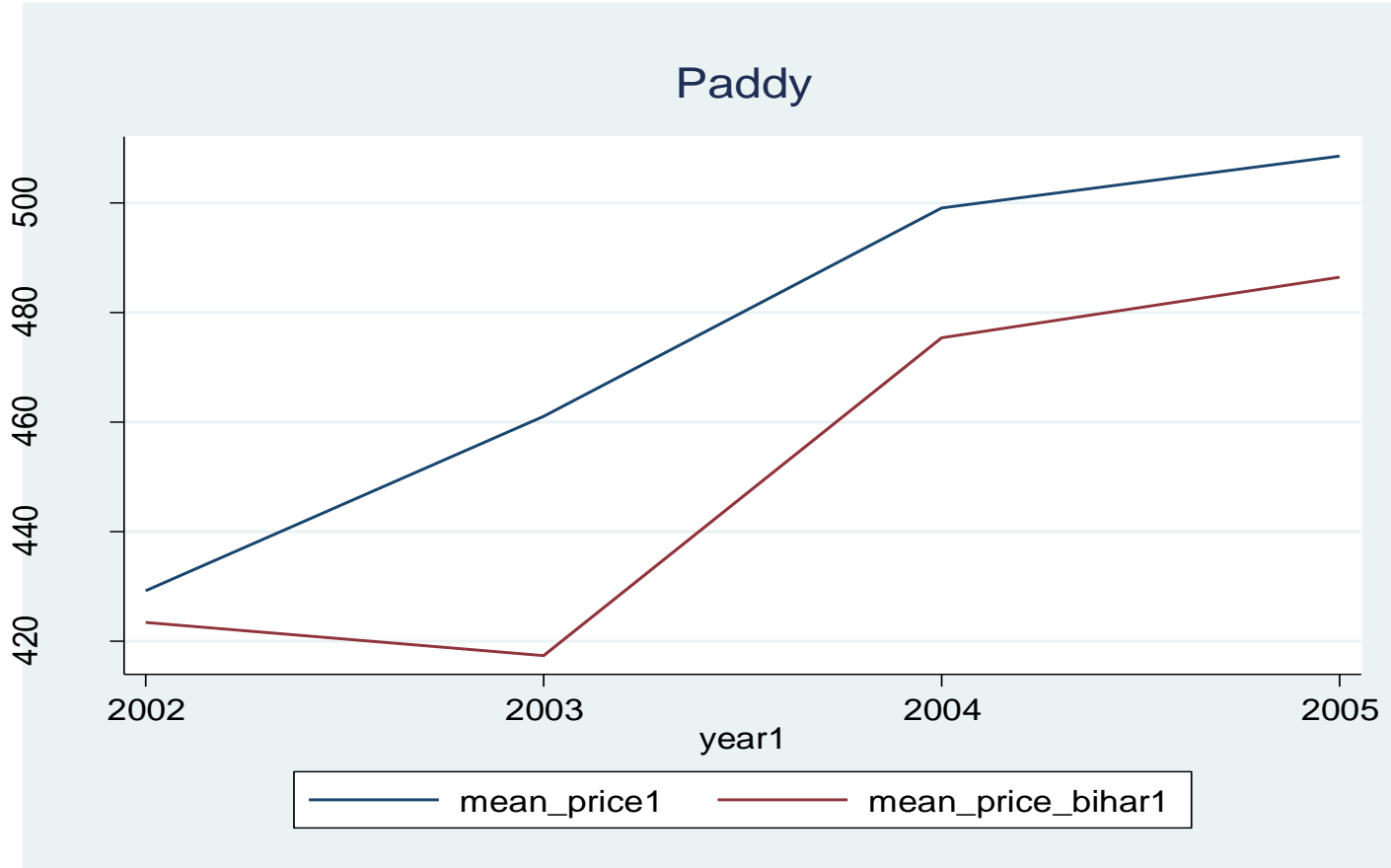


The effect on grain trade

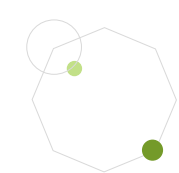
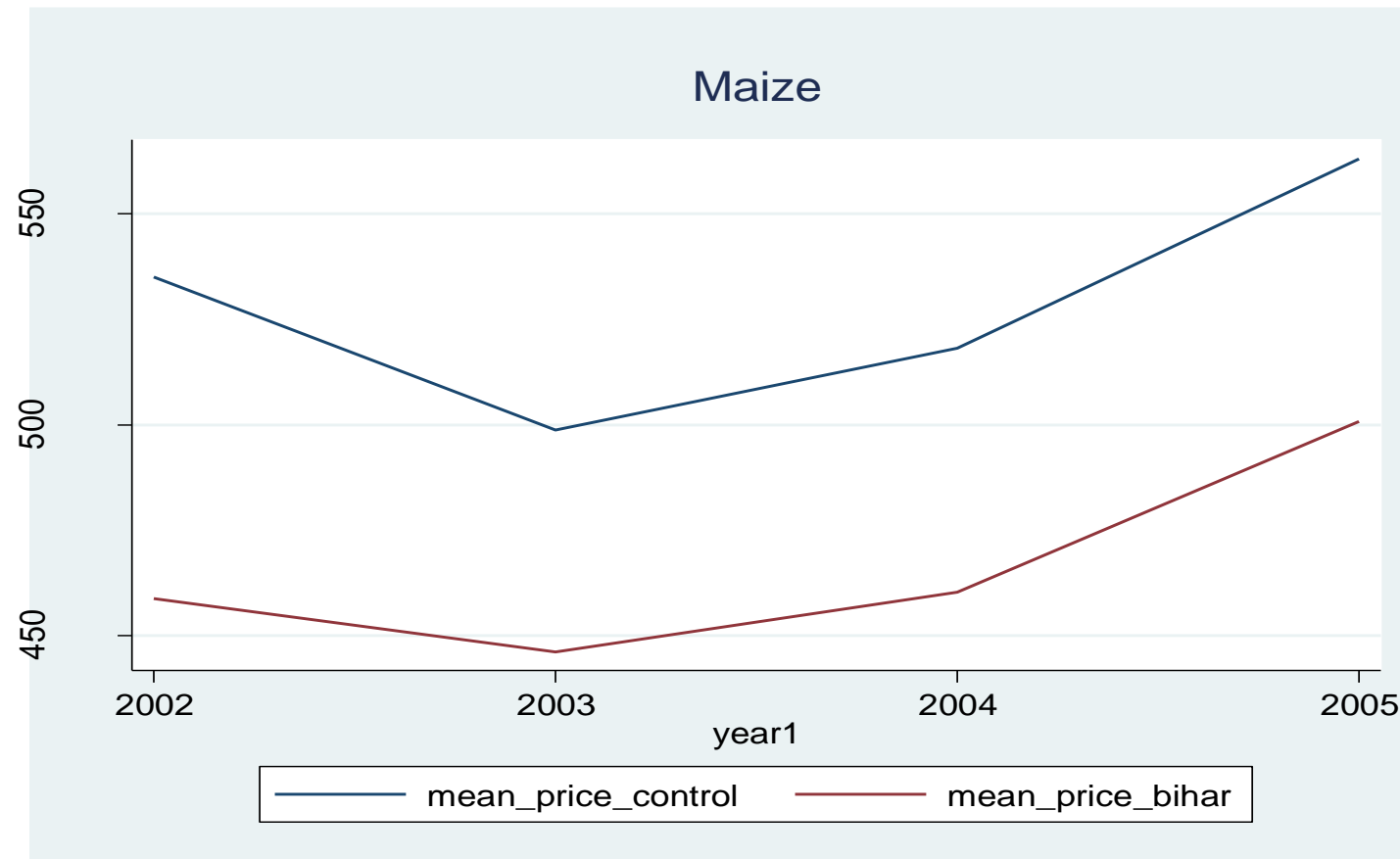
- Wheat trade in the Ara mandi declined sharply
 - The number of *Aarhatiyas* went from 35 to just 2 in 2011
 - Small *baniyas* stopped coming to the mandi. They were selling directly to the big traders and flour mills
- The process of direct sales outside mandi was there even when the APMA was in effect
 - But the taxes and bribes for direct selling and inter-district movement of grains disappeared
 - Traders and mill owners benefited from this change
- Corporate buyers did not buy from farmers or PACS even after the change in the law
 - Farmers continue to sell their surplus grains to local *aarhatiyas* who then sell it to larger traders



Paddy Parallel Trend



Maize Parallel Trend



Variable	Farm Harvest Price (Rs/ctl)	
	Paddy	Maize
post treatment 2006-07	146.9280*** (7.8547)	-47.8539 (34.5887)
treatment-Bihar	0	0
	<i>YDID</i>	
	-43.6421*** (16.0558)	105.5245*** (34.2656)
constant	536.4167*** (5.4601)	533.1959*** (17.4725)
Farmer fixed effects	Yes	Yes
N	10967	362
R-sq	0.7518	0.1709

Other controls include Drought-less, medium and severe

Robust SE clustered at district level

* p<0.10

** p<0.05

*** p<0.01"



Marginal paddy farmers suffered larger losses

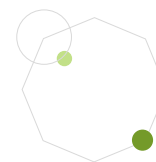
Variable	Marginal Farmers		Large farmers	
	Paddy price	Maize price	Paddy price	Maize price
post treatment 2006-07	148.5756***	0.0000	137.8294***	-50.0000
	(2.4991)	(95.3762)	(2.2083)	(72.4680)
treatment-Bihar				
γ_{DID}	<u>-54.4381***</u>	40.0	<u>-35.5755***</u>	118.0
	(5.7797)	(114.6279)	(5.9667)	(74.8447)
_cons	533.4680***	549.7194***	542.6133***	539.8244***
	(2.3287)	(58.8598)	(2.0817)	(17.0948)
N	1341	42	1290	52
R-sq	0.8187	0.1149	0.8042	0.4022

Standard errors in parentheses

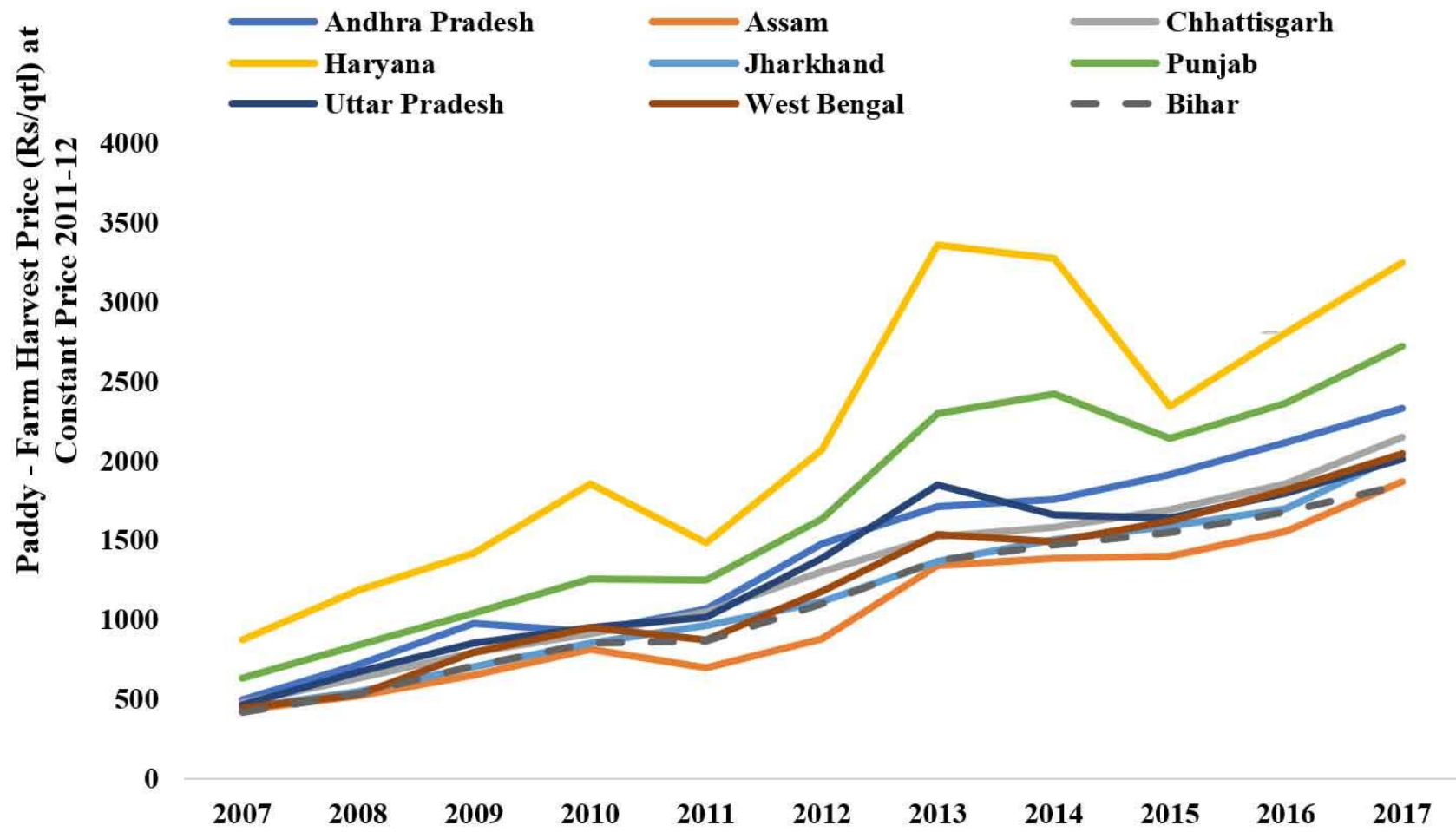
=** p<0.10

** p<0.05

*** p<0.01



What happened is this: hence the complex of policy



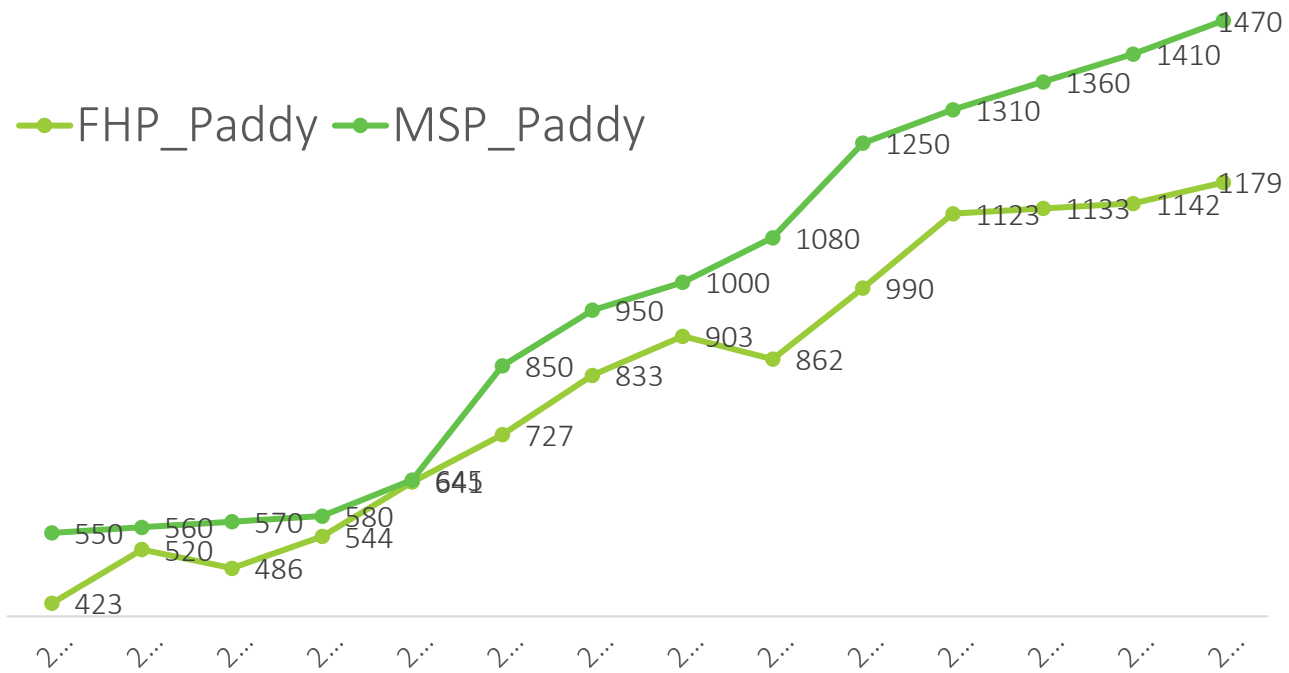
Implications

- Farmers gained where the market surplus is large, and the state is a major export hub
- Entry of large corporate traders like Cargill did not hurt farmers



High MSP of Paddy: Can it benefit farmers of Bihar?

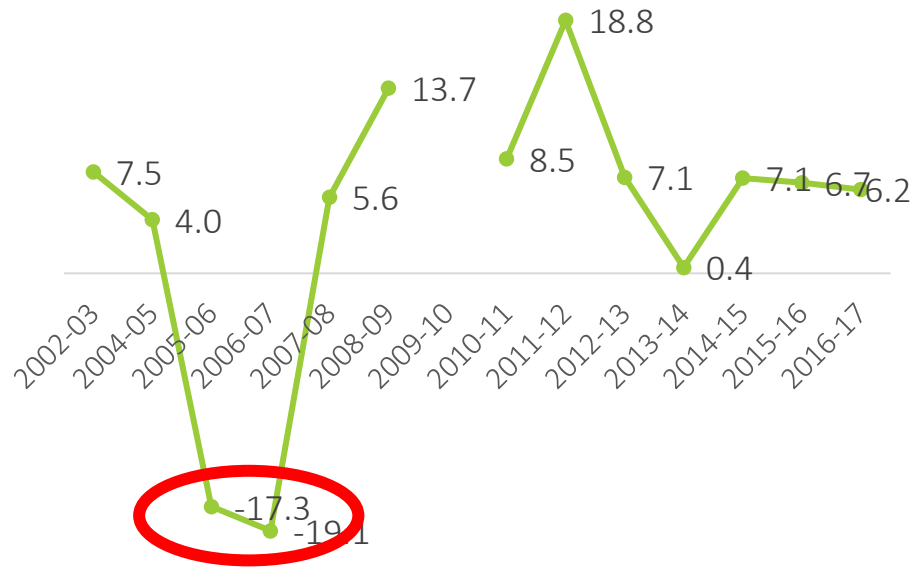
The gap between MSP & FHP of Paddy in Bihar
(Rs/quintal)



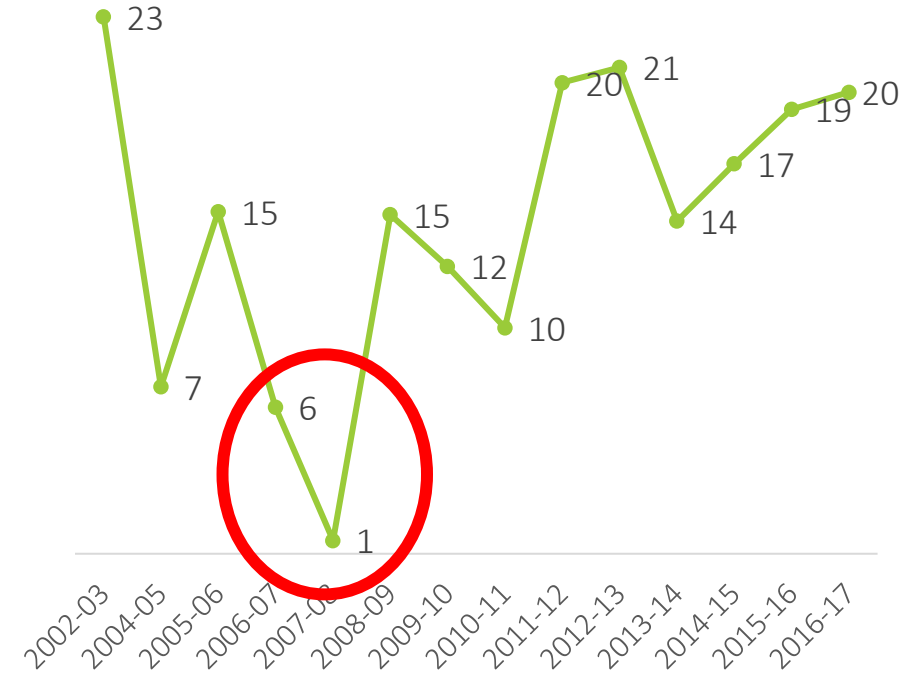
- The gap between MSP and FHP has increased over the years.



% Gap between MSP and FHP of Wheat



% Gap between MSP and FHP of Paddy



Market access and crop choices

- Emran and Shilpi (CJE)
- Birthal, Negi and Roy (2019)
- Market access matters for diversification
- Policies like MSP and procurement matter significantly
- Big factor in India vis-à-vis other countries
- More market access move away from pulses and oilseeds
- Allen and Aitkins (2016) move away from non-cereals

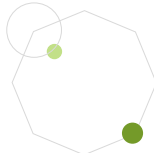
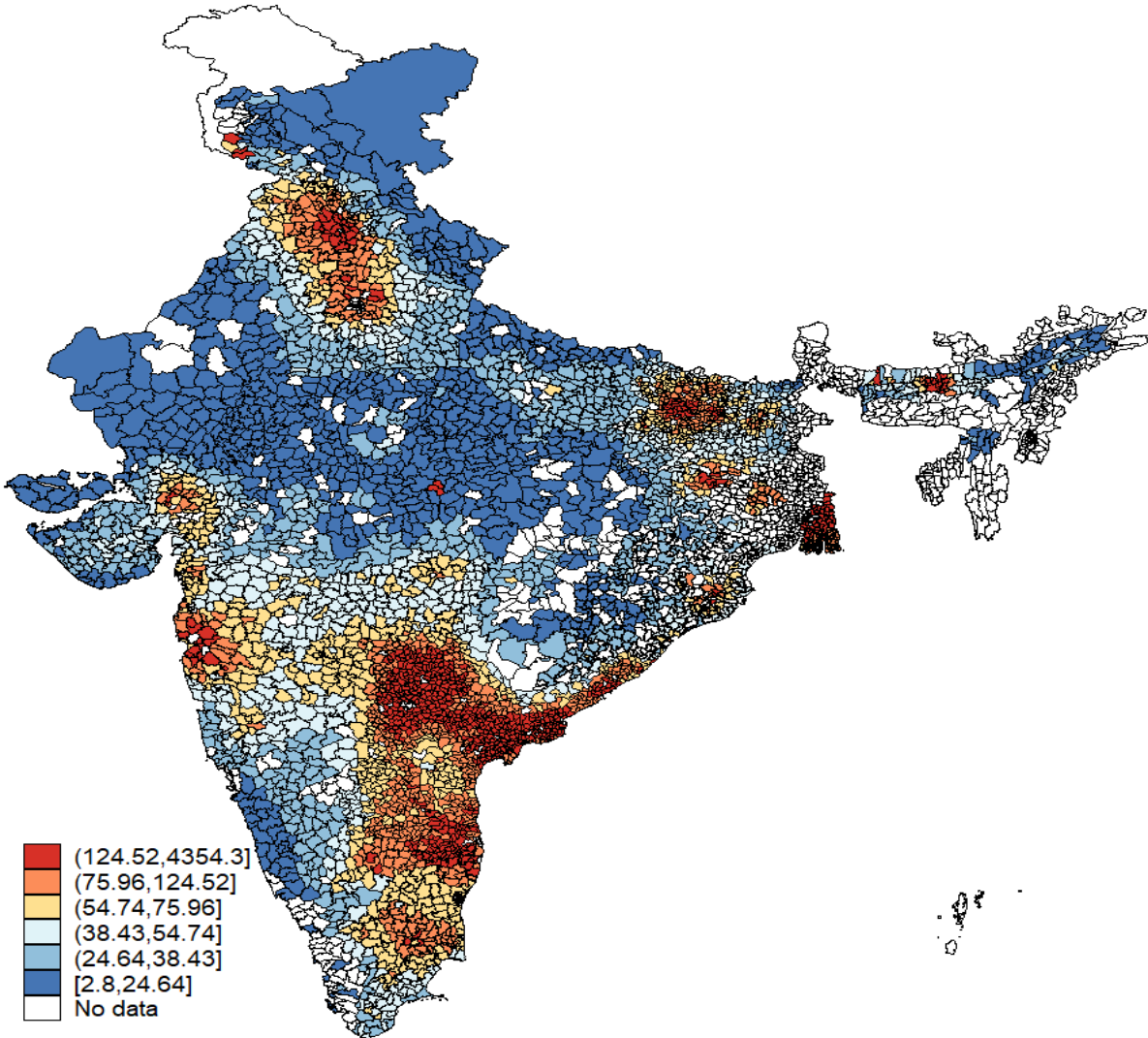


Measure of market access (pioneering literature from Dave Donaldson and others)

- Road transport costs extracted from ‘the operational efficiency of freight transportation report’, by the Transport Corporation of India Limited and Indian Institute of Management, Calcutta.
- We use Open-Source Routing Machine (OSRM) and OpenStreetMap to find the shortest optimal road distance between two tehsils (based on latitude and longitude of centroids).
- This procedure is implemented using `osrmtime` command in STATA 15. We calculate bilateral transport costs (BTC) between 18 million origin-destination tehsil pairs.
- Market size based on night light data for local GDP



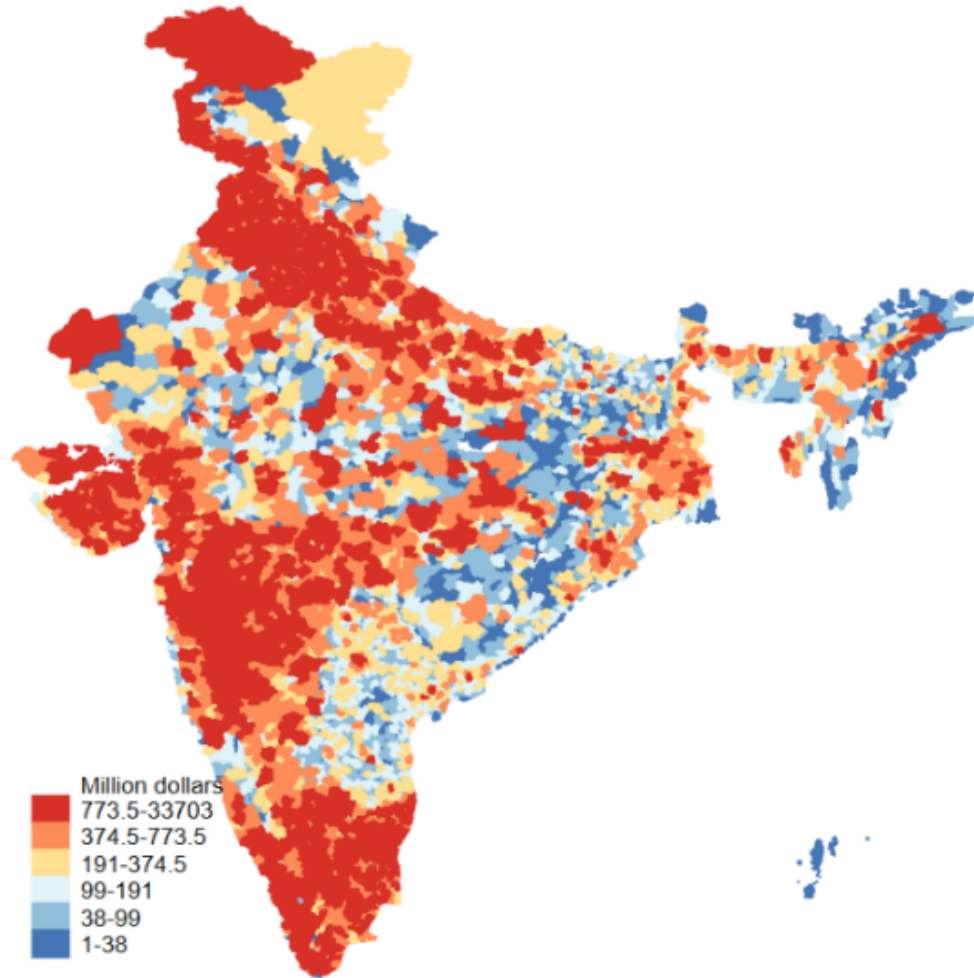
Market access variation



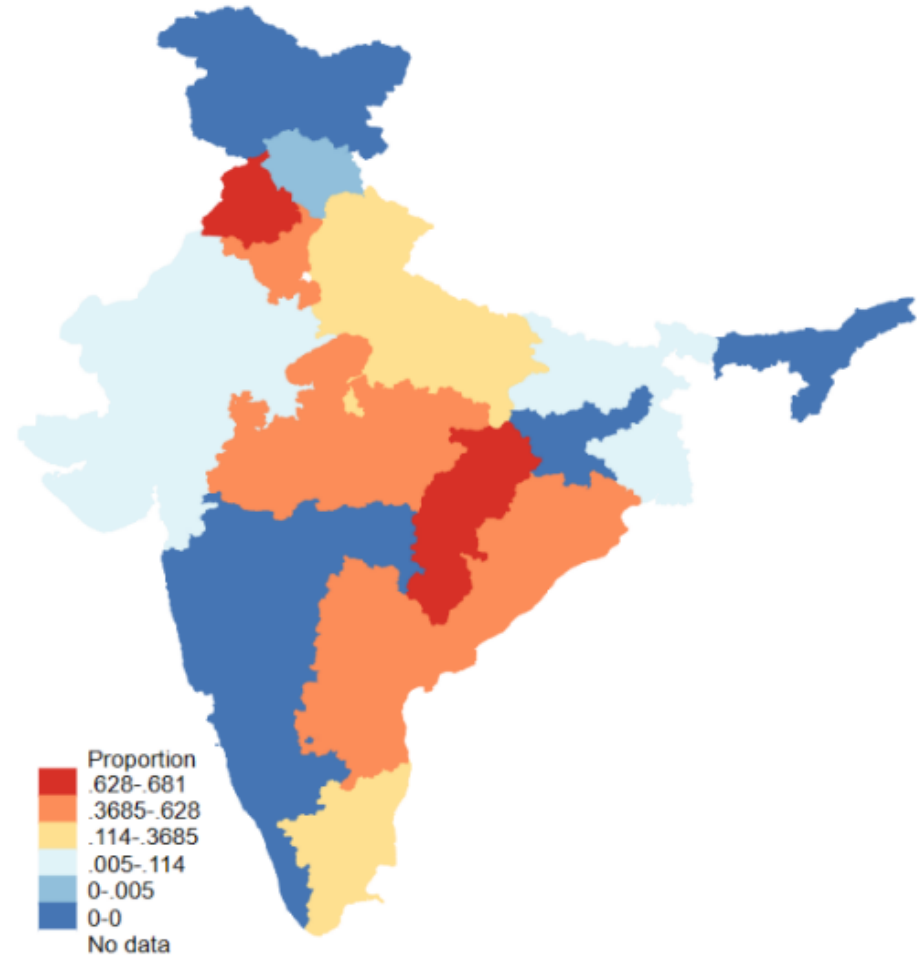
Market size and procurement:

map of nighttime light-based GDP, and government procurement of cereals at MSP

(a) Night Light Based GDP



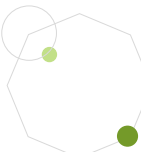
(b) Procurement



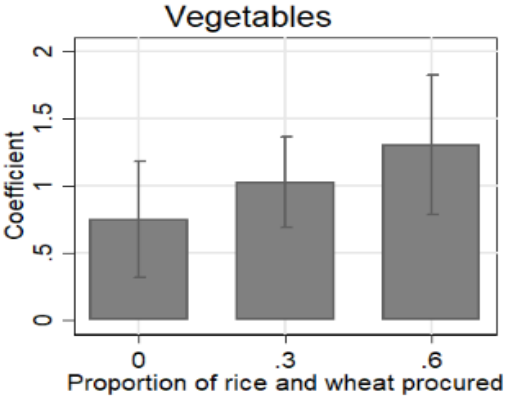
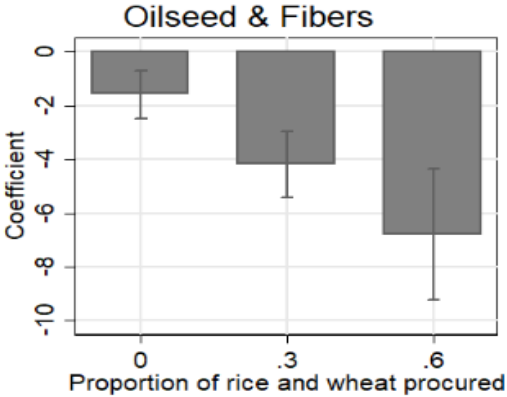
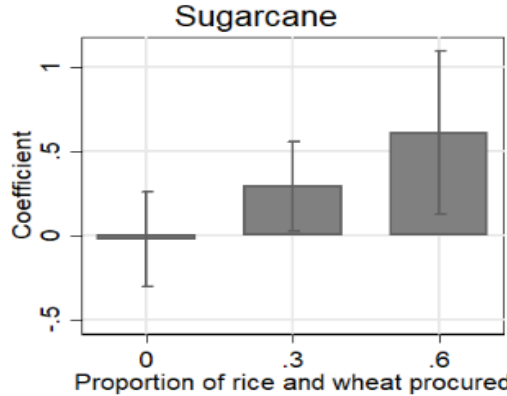
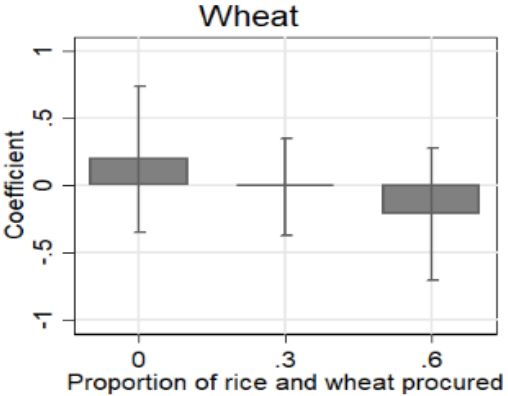
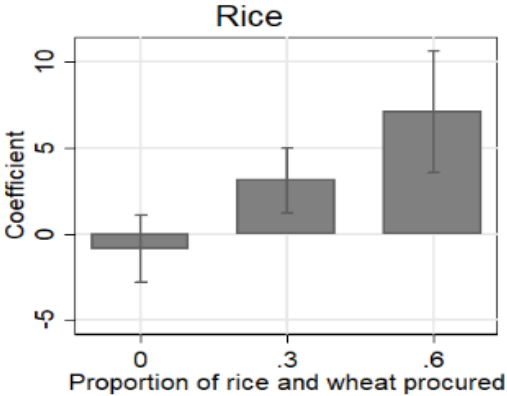
Effect of market access on crop choices



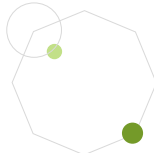
	Rice	Wheat	Pulses	Sugarcane	Oilseed-Fibers	Vegetables	Fruits-Plantation Crops
Ln (MA)	6.749***	-0.271	-2.097***	-0.306**	-3.149***	0.767***	-0.702*
	(1.150)	(0.341)	(0.527)	(0.145)	(0.721)	(0.258)	(0.395)
N	4138	4138	4138	4138	4138	4138	4138
Breusch-Pagan heteroscedasticity test							
$\chi^2(1)$	38.26***						



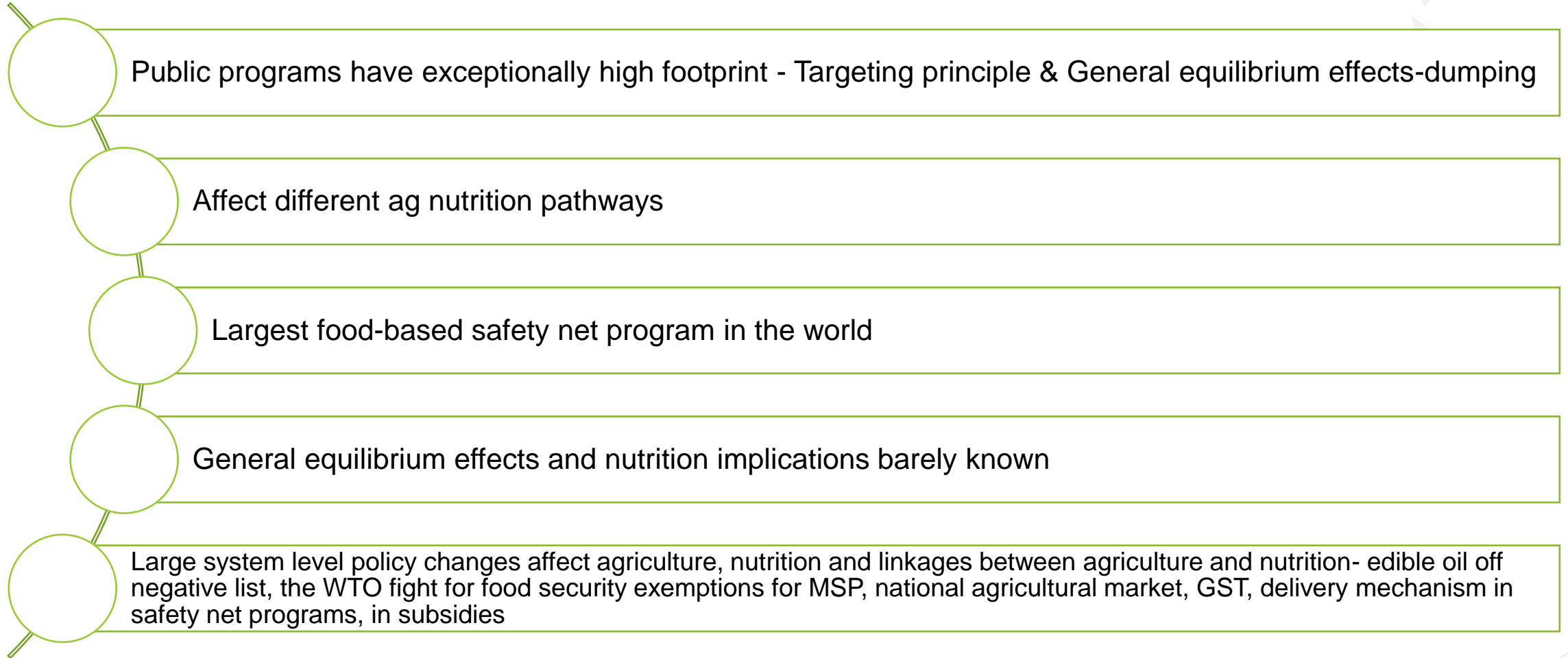
Attenuation effect on market access



Note: With 95% confidence intervals.



Specificities in India



With cheaper pulse in PDS, HHs reduce market purchase and use of other pulses

	(1)	(2)	(4)	(5)
VARIABLES	Tur_total(PDS+Mkt)	Tur_market	dalotherthantur	totaldal
Impact of 10kg pulse in PDS	6.222***	-3.841***	-2.370***	2.904***
Constant	11.72***	11.73***	10.61***	33.94***
Observations	1,266	1,266	1,266	1,266
R-squared	0.150	0.087	0.391	0.289
Number of Households	685	685	685	685



Similar work on edible oils (Jumrani and Meenakshi 2020)

- Negative tax (subsidy) on palm oil implemented in three states— Tamil Nadu, Maharashtra and Andhra Pradesh—
- Meenakshi and Jumrani find that subsidy on palm oil led to an increase in its consumption, both in rural and urban areas, with effects being more pronounced in rural areas.
- The increases are also the largest in Tamil Nadu, relative to other states.
- Consistent evidence that consumers displaced market-sourced groundnut and coconut oils for palm oil.



High MSP + low procurement + high NFSA allocation: A toxic mix for farmers in Bihar

- 3.3 million tons of rice and 2.2 million tons of wheat to Bihar
 - 86% households to benefit from NFSA subsidy
 - **1.9 million ton** more subsidized rice + wheat compared to pre-NFSA period
- Public procurement is low
 - Rice : 1.2 million tons; Wheat: **nil**
- Home production = local consumption for rice; 1.2 million tons deficit in wheat

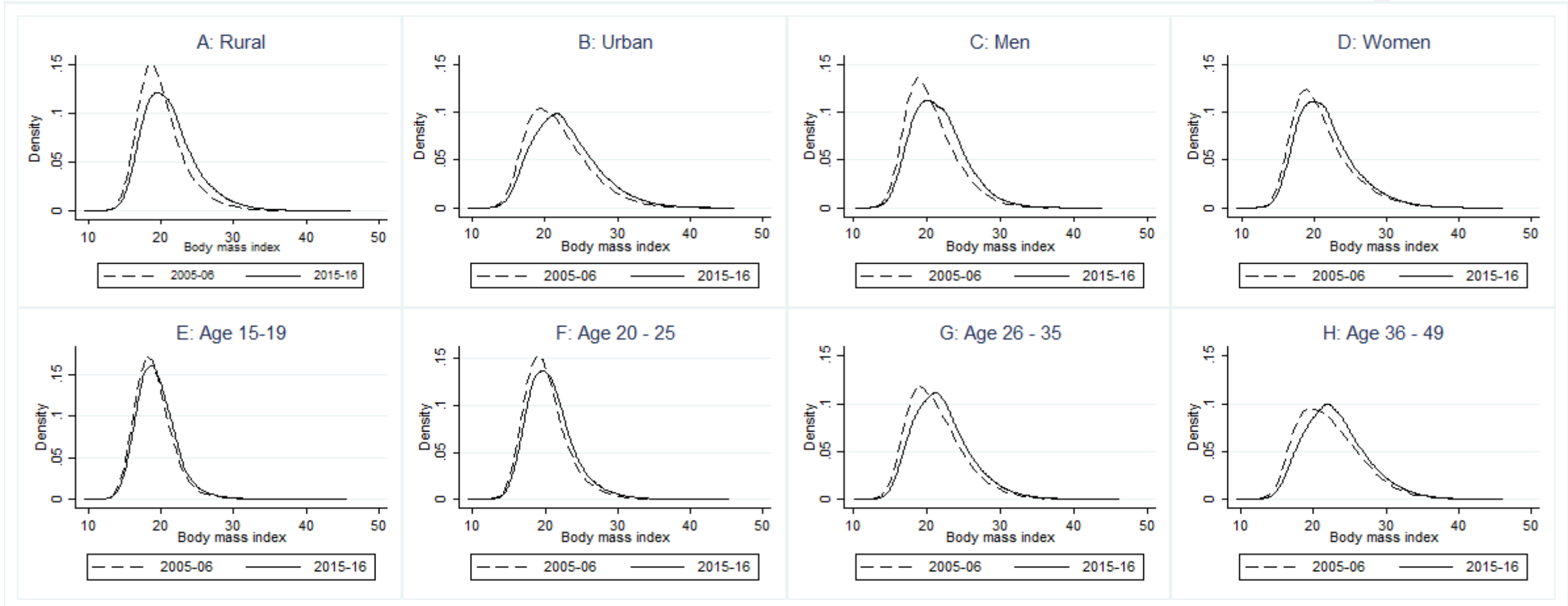
(Local production + NFSA imports) >> Domestic demand

- 4 million tons of cheap rice & wheat dumped from other states through the NFSA and more through the OMSS operation of the FCI
- Consumers will benefit(?), but agriculture will not
 - Smuggling to Bangladesh and Nepal could hurt farmers there too
- Increasing procurement will lower the incentives for much needed crop diversification



What is happening- Rising obesity

(Iannotti, Joshi, Kishore and Roy, mimeo)

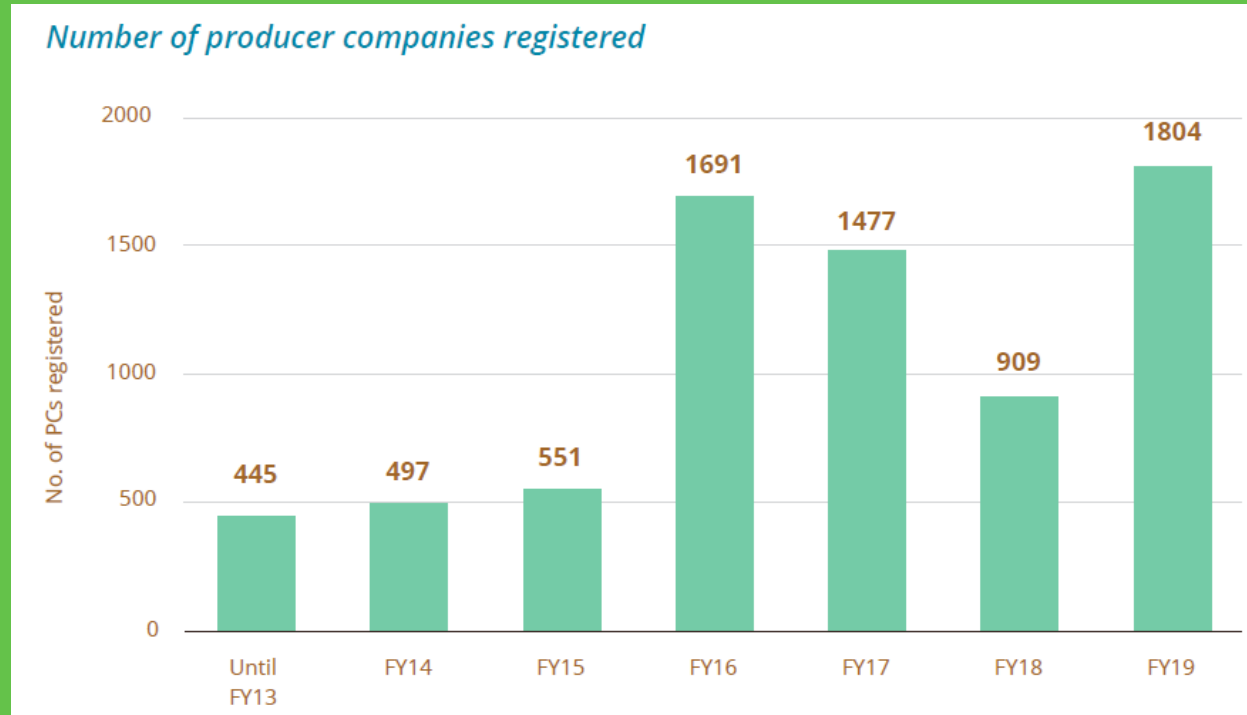


Farmer organization: Panacea for all problems?



Some stylized facts

- 7,374 producer companies covering over 4.3 million small producers by 2019
- Over the last 17 years, there has been a substantial increase in **registration** of FPCs in India which coincides with central and state government schemes.
- Time bound support with funds has led to emergence of several FPOs that last for short periods tallying with the funding cycle- Negative selection where those who lead FPOs self select with motivation for lump sum gains



Source: R Govil et al, 2020



Motivation for our study: continued

- Most Literature looks at successful FPOs, what and how much are returns to farmers and emphasis on distribution of value
- Literature and policy discussion focused on distribution of value
- Some papers (like Singh & Singh, 2013) look at how farmers are “hoodwinked” into getting smaller returns, FPOs not catering to farmer wellbeing. But the focus is on distribution of value and economies of scale argument
- In our research we challenge that discourse – we focus on creation of value as essential where most FPOs falter and can be mapped into incentives, selection and policy induced distortions
- Also need to answer the counterfactual question- even if farmers are better off, even if agricultural income has gone up – has it gone up to the potential, is it the maximum it could go?
- **In order to do that, We flip the question**
 - In spite of so much emphasis, the policy focus (by government and donor agencies) on FPC promotion - why only few FPC succeed and many fail -close down, have certain periodicity sporadic-come up and die down/ shorter life cycle. Even the ones making gains/profits have been at modest level not able to scale out.



Results – Round 1

Determinants

Marginal Effects (Probit Regression)	Productivity increase (Yes=1; No=0)	Cost change (Yes=1; No=0)	Income increase (Yes=1; No=0)
Outcome Variables →			
OFPO member	0.154*** (0.050)	0.040 (0.060)	0.110** (0.040)
Other controls	Experience, social caste, usage of mobile information, years of membership, irrigated area, access to credit, sources of information and governance indicators		
Fixed effect	Crop and Location fixed effects		

Impact on MPCE (INR) – Multinomial Endogenous Switching Regression Model

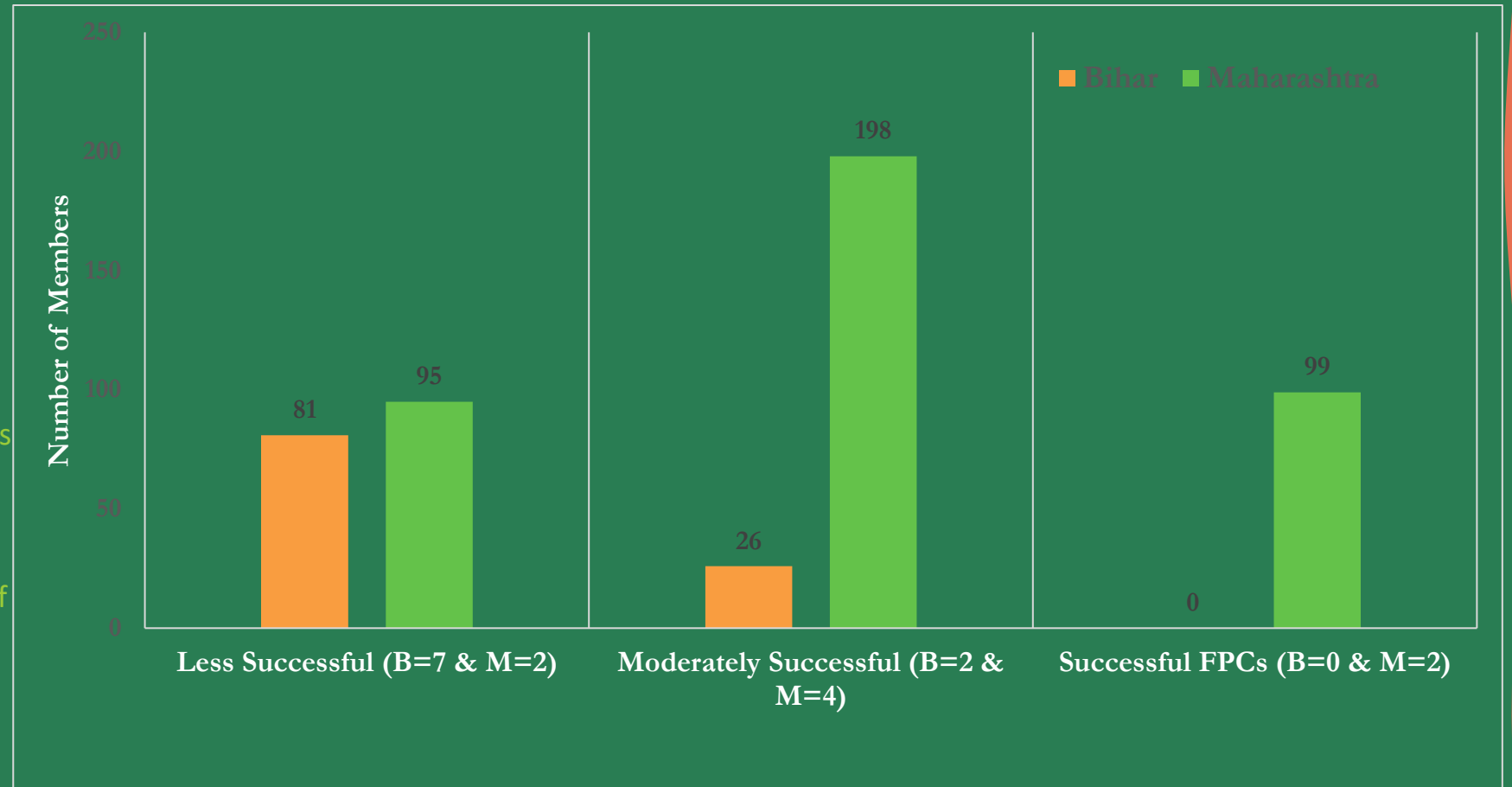
		Associated with FPO	Not associated with FPO	Treatment Effect ATT/ATU	% change
OFPOs	Associated	2322.7	1985.2	ATT = 337.5***	17.0
	Not associated	1728.4	1749.8	ATU = -21.4 ^{ns}	-1.2
PFPOs	Associated	1832.4	1605.6	ATT = 226.8***	14.1
	Not associated	1995.9	1749.8	ATU = 246.1***	14.1

Number of Members Cluster Wise

In the study, based on FPC composition and its characteristics three clusters were identified.

Each cluster consists of FPCs with similar or close characteristics which include

- Group size
- Criteria of member selection
- Socio-economic profile of FPC members
- Type of FPCs (nature of support received)
- Members' perception on functioning of the FPCs






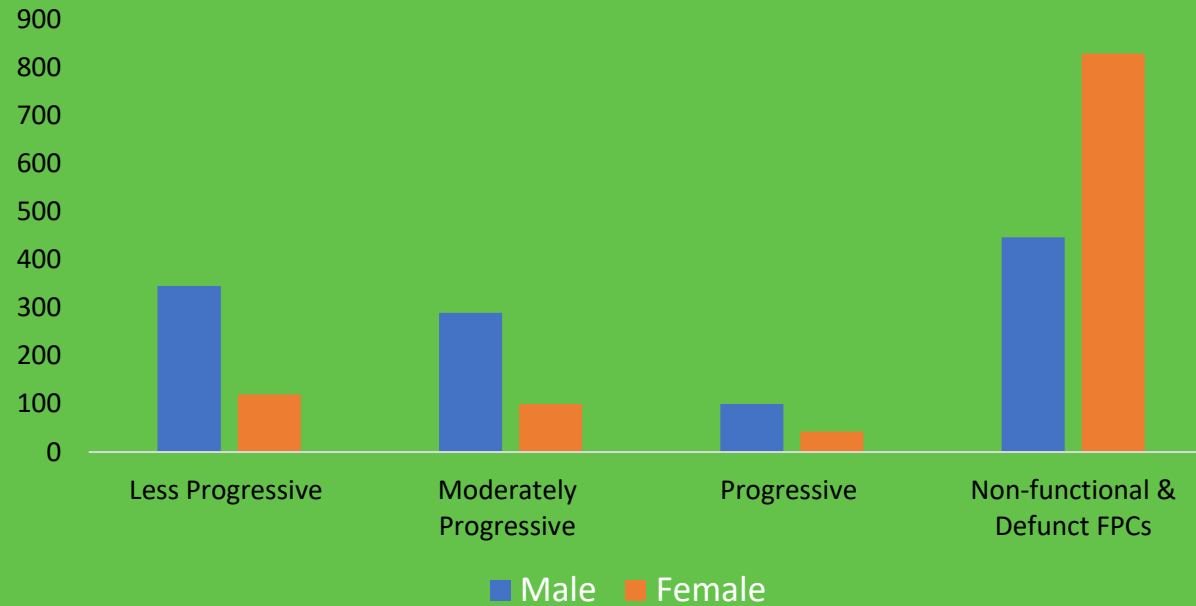
Cases of Non-functional FPCs

- About 15 of the 32 FPCs went defunct or were non-functional by the second round of survey.
- Most of these FPCs had shut their operations in a span of 3-4 years from time of registration tallying with the funding cycle.
- In Bihar, out of 18 FPCs supported by NABARD or SFAC about 9 were defunct.
- Many of these non-functional FPCs had been struck off under the Companies Act 2013, Section 248, according to Ministry of Corporate Affairs (MCA).
- Reflects weak internal governance of the FPCs

The possible reasons as mentioned by the ministry include

- failure of the FPC to commence business operations within one year of incorporation;
 - failure of the original subscribers (shareholders) to fully pay committed subscription (share capital) within 180 days of registration,
 - not carrying on any business or operations for a period of two immediately preceding financial years without submitting any application for obtaining the status of a dormant company under the section 455. The MCA also strikes-off FPCs for not maintaining any of the mutual assistance principles specified under Section 581ZP.
- 

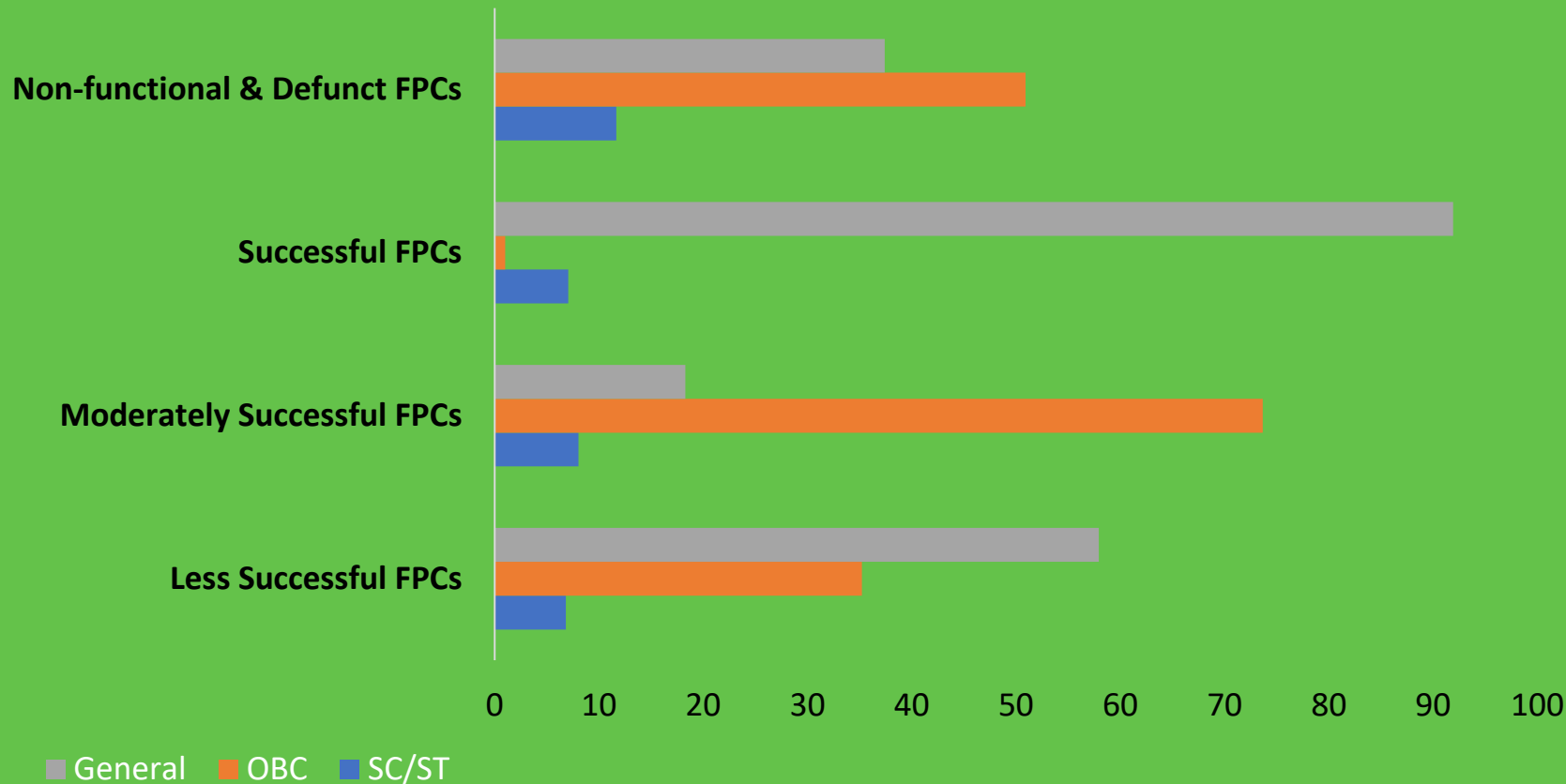
FPC Characteristics – Group Size



- Smaller groups are easier to monitor and the coordination among members and leaders is smoother
- Free-rider problem makes smaller groups more effective. While individuals always have an incentive to shirk and free-ride on their fellow group members, the effect is more pronounced when group size is large
- There is an optimal size of FPOs determined by competing forces of scale economies and ability to monitor and deliver on attributes like quality and product differentiation



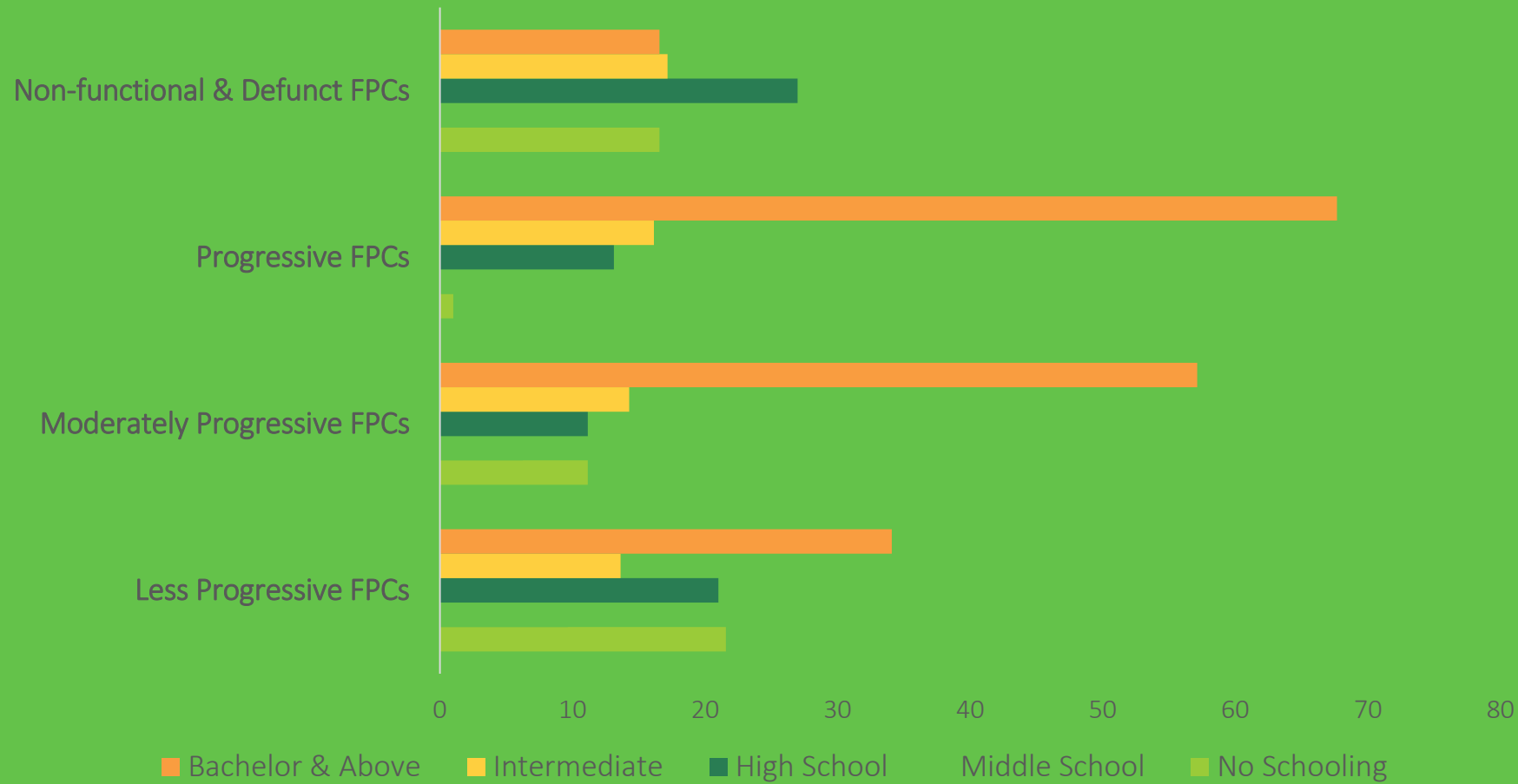
FPC Characteristics



- Diversity in a group can represent opportunity as well as threats
- A heterogeneous group can give competitive advantage - as members are with different skill sets, ability and experiences), if managed properly by its leadership.
- On the other side, it can also increase the potential for “process losses” due to intragroup conflict, miscommunication, and lack of trust. These challenges can get exacerbated by outdated management styles based on the assumptions of homogeneity and individual performance
- Heterogeneity in terms of caste – successful group more homogeneous consisting members of higher castes with access to resources and social capital compared to other two clusters



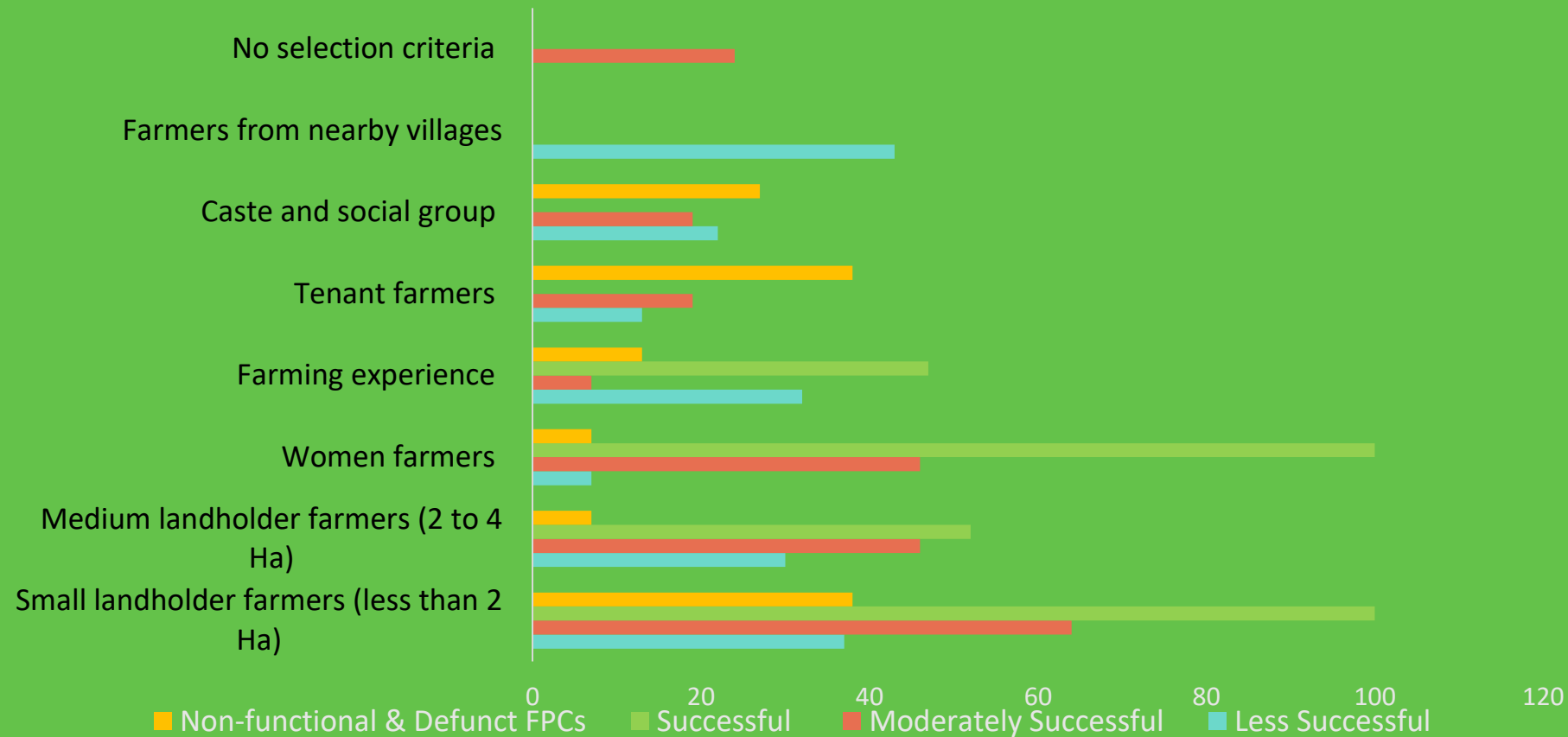
FPC Characteristics



Education – members with higher education helps in accessing resource and exhibit greater likelihood of membership in the FPC which is found in successful cluster compared to other two clusters



FPC Characteristics – FPC Composition



- successful cluster had more diversity – women members, small and medium landholders, farming experience
- Foundation of the groups – NRLM Jeevika versus ATMA and Kisan Clubs. Performance of latter better as they had prior experience and heterogenous skills beneficial for the FPCs. While Jeevika FPC consists of SHG members not necessarily with farming experience or motivation.



Conclusion

- Focus needs to shift from creating bigger and a greater number of FPCs to optimal FPCs which delivers on farmer level outcomes and context based heterogeneity
- The policy induced negative selection – criteria of selecting members, objectives and functioning leads to sub-par outcomes
- Incentives offered by policy, akin to infant industry protection, leads to agency problems – elite capture and rent seeking
- Group Size and composition plays important role improving FPCs performance
- Heterogeneity in membership plays an important role – different skills combine to give better results.
- Focus on product differentiation and creation of value through food safety, labelling, certification and innovations in delivery can improve market access and FPC outcomes
- Along with the quality of leadership, commitment of member farmers to the collective cause- important determinant of its success.
- Leadership which encourage active member participation in day-to-day activity for handling domain builds positive learning curves.



Rising snack consumption in India

- >1000 snacks and 300 types of savouries
- Unreliable estimates of volume, value and penetration
 - Rs. 100 billion in value & over 0.4 million tonnes volume*
- Growing @ 20-25%/year
 - From Rs. 24 billion in 2008 to Rs. 80 billion in 2013
 - Predicted to grow at > 20% over the next few years
- Distribution and penetration increasing in rural areas and poor households
 - Highly profitable : low production cost, long shelf-life, high retail value
 - smaller packs and lower price points are growth drivers



Snacks/obesogenic foods

- Snack consumption in rural areas monotonically increases with wealth.
- Adults living in urban areas have significantly higher per capita expenditure on snacks, especially those in the bottom two wealth quintiles.
- There is a decline in urban expenditure on snacks from the 2nd to the 4th wealth quintile after which it again rises
- The urban poor have the unhealthiest diets, with low consumption of pulses, fruits, and vegetables and very high consumption of obesogenic food



Association of food access with nutritional status and body size measures among rural adolescents from the Pune Maternal Nutrition Study

Anjali V Ganpule-Rao¹, Devesh Roy², Bhushana A. Karandikar³, Elaine Rush⁴, Chittaranjan S. Yajnik⁵

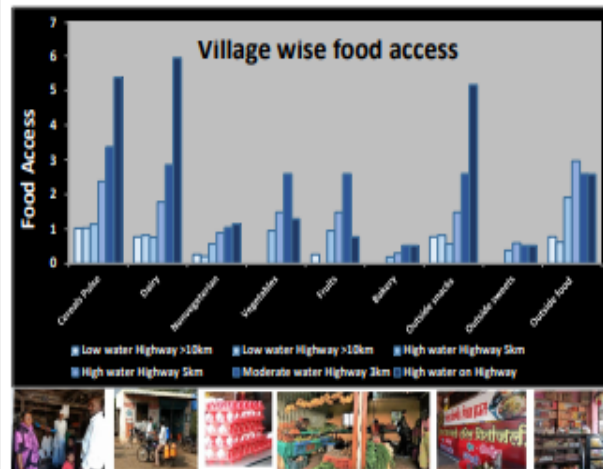
¹ IMMANA Research Fellow, Tufts University (Boston, USA) at Diabetes Unit, King Edward Memorial Hospital Research Centre, Rasta Peth, Pune, India; ² Senior Research Fellow, Agriculture for Nutrition and Health, International Food Policy Research Institute, Washington, DC; ³ Gokhale Institute of Politics and Economics, Pune, India ⁴ Faculty of Health and Environmental Sciences, Auckland University of Technology, Auckland, New Zealand and Riddet Institute, Palmerston North, New Zealand ; ⁵ Diabetes Unit, King Edward Memorial Hospital Research Centre, Pune, India

Introduction

- Geographic access to food resources remains a major area of research from the point of view of consumption of adequate and healthier diet. This research is particularly relevant for India where despite economic development, a large population is unable to fulfill its nutritional needs.
- Food environment studies undertaken in developed countries using advanced techniques are of limited use in developing countries as the food environment is significantly different in terms of types of stores available, traditional food practices and the range of products sold.
- We studied association of rural food environment, food access with nutritional

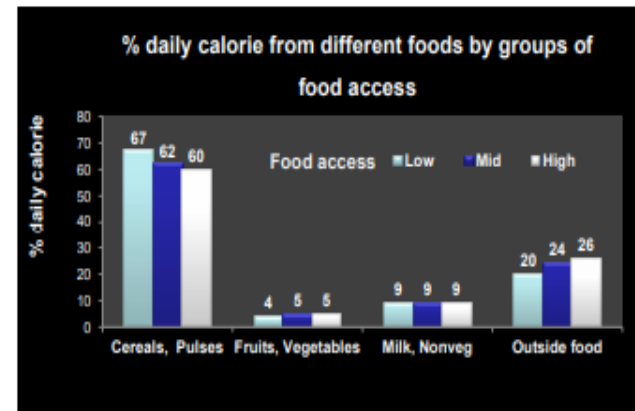
Methods

Village wise food access (number of shops providing different foods/1000 population) Water availability, Distance from the highway



- Villages with more months of water supply and located closer to the highway had higher food access.

Results



- Higher food access → lower % calories from cereals pulses but higher from outside foods.

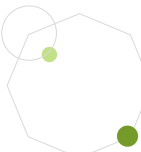
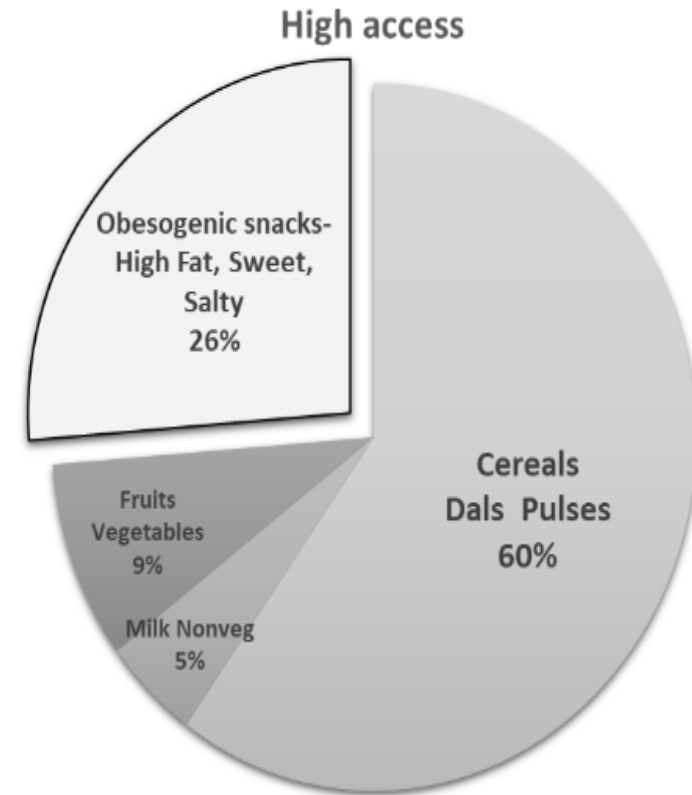
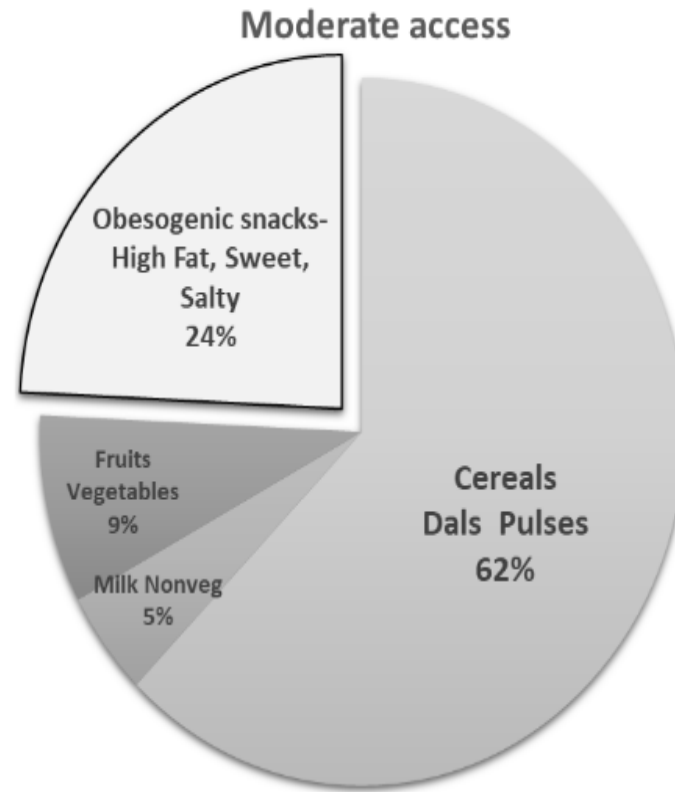
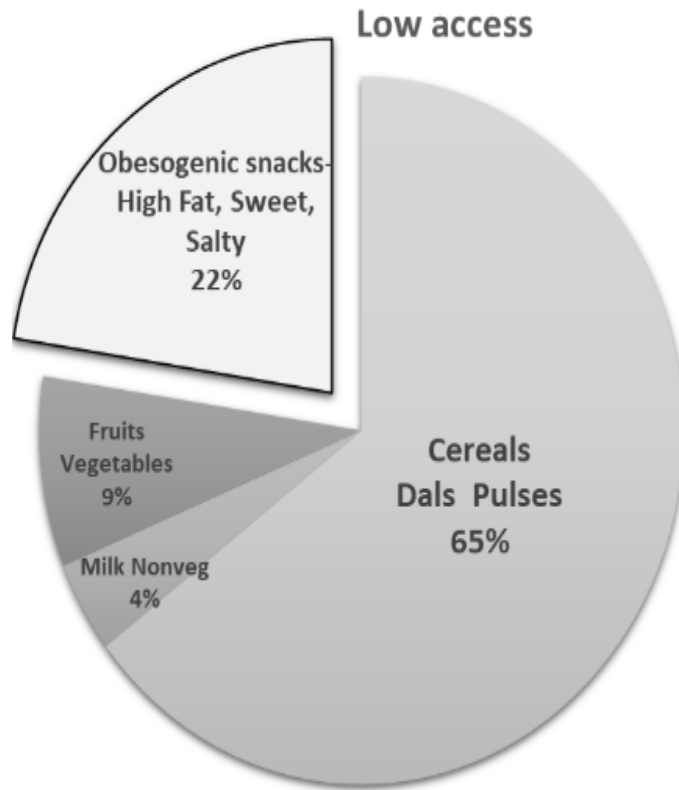
Independent of food access and socioeconomic status

- Dietary diversity scores (FAO) were low (4-5/9)
- Half of boys and girls had insufficient circulating B12 <140 pmol/L, 14% boys and 30% girls were anemic (hemoglobin <13 g/dL boys <12 g/dL girls).

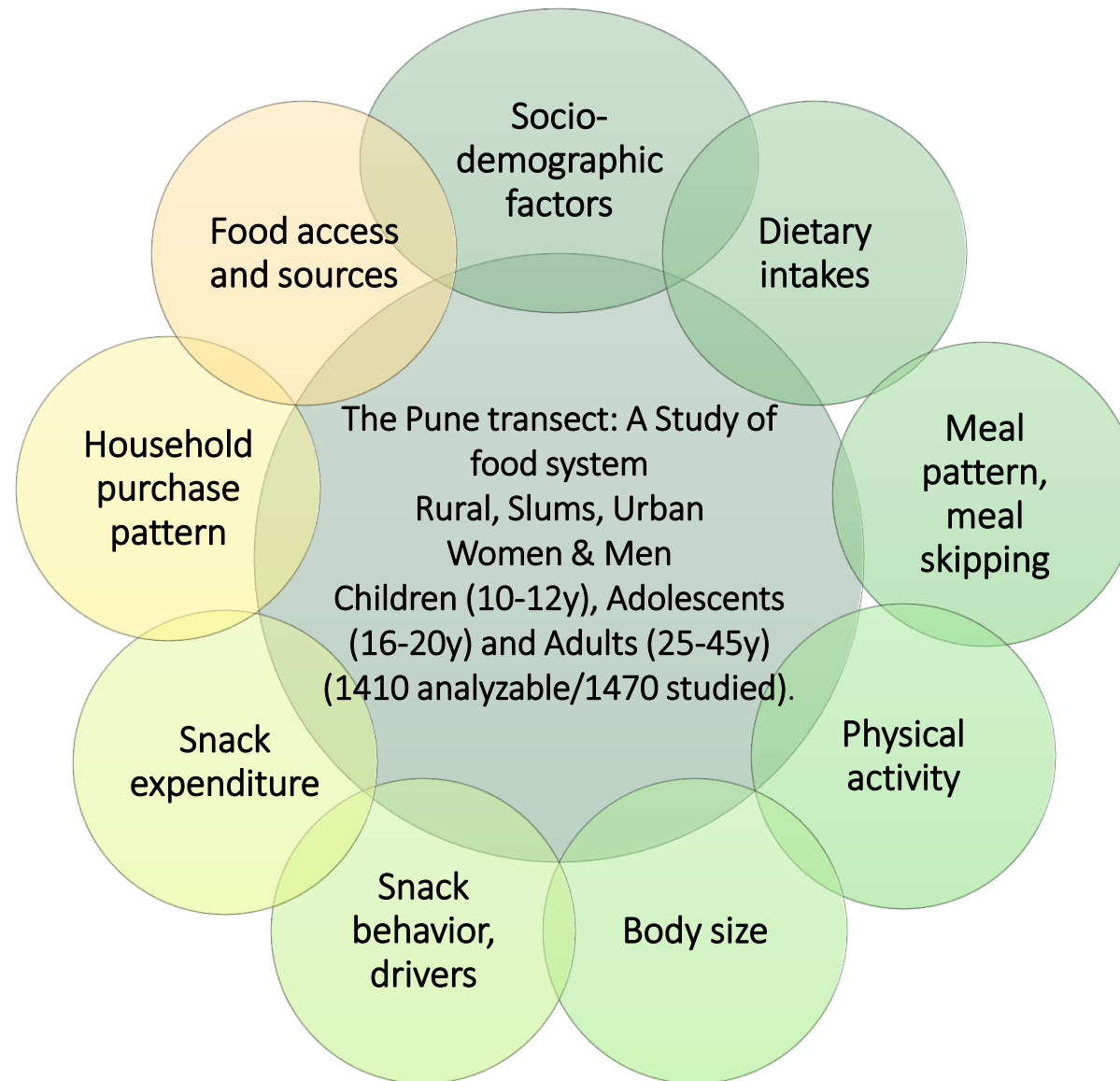
Summary

- Our results help to understand the rural food system with substantial lack of access to healthy food options on one hand and easy access to obesogenic snacks on the other.
- Lack of ease of access to a supermarket is generally termed as "food desert". In our study lack of access to nutrient dense including good quality protein, micronutrient rich foods can be termed as "nutrient desert".
- Food access is not food security. Nutritionally adequate and healthy consumption patterns are not supported by the current environment.

More on food access



Snack food/processed food/eating out pattern in the urban, peri-urban and rural settings in Pune District

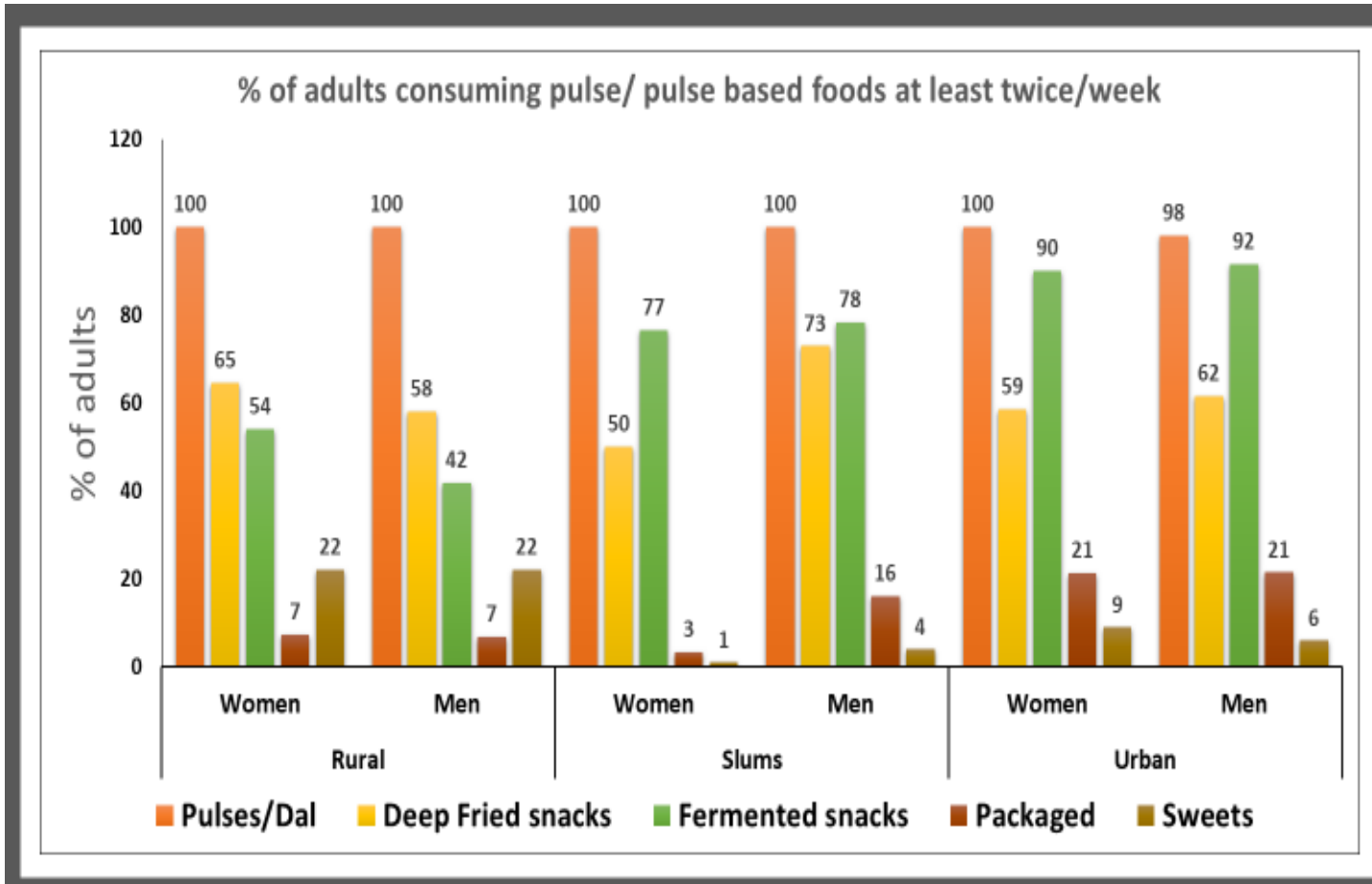


Pune transect study:
Roy, Ganpule, Boss,
Kishore et al



Rapid changes in food environment and consumption of snack foods

A4NH. Ghokale Institute" survey of men and women, 25-45 years, Pune, India (150/location)

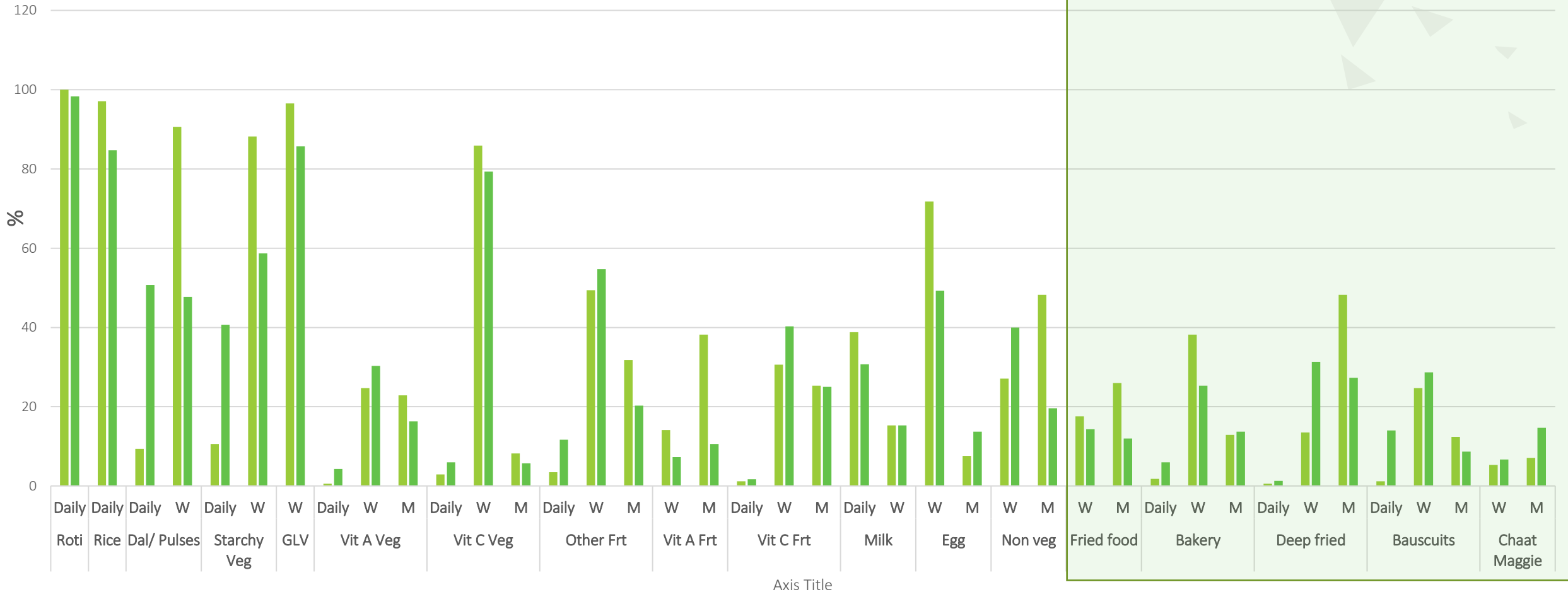


	Avg quantity consumed/ month (g)
Dals/Pulses	3094.98
Pulse based snacks	
Packaged	265.38
Sweet	419.48
Fried	638.68
Fermented-South Indian	593.17
Chaat	168.33
Total	2085.04

Snacking Frequency:
 Children 2-3 per day
 Adolescents: 1-2 per day
 Adults: 1 per day

High consumption of Pulse based products in routine diet among adolescents and children

Food consumption among adults



■ % Males ■ % Females

Gresham's law "bad money drives out good."
Crowding of bad foods is driving out good foods



Over Half of SDGs relate to Food Security and Nutrition



SUSTAINABLE DEVELOPMENT GOALS

