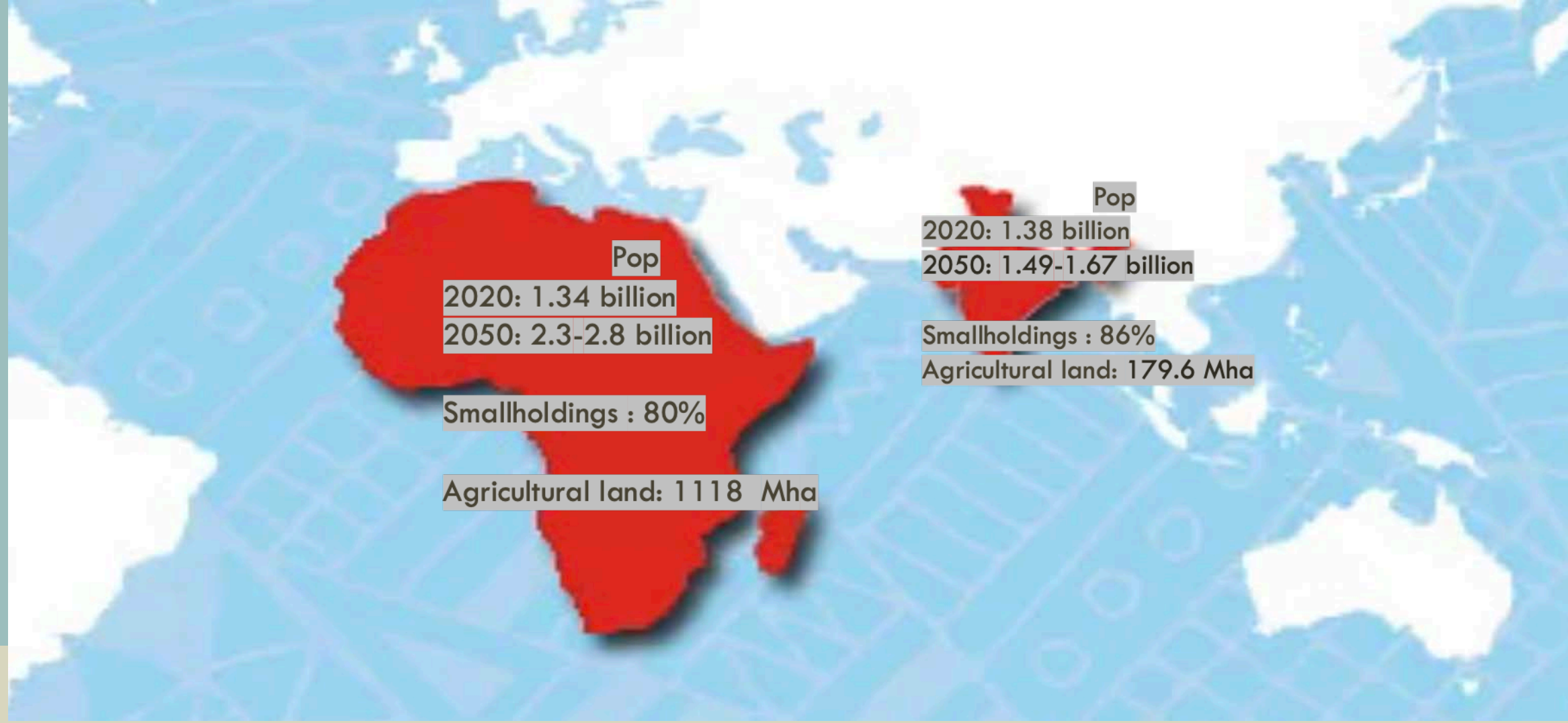

INDIA-AFRICA COMPARISON OF AGRICULTURAL & FOOD TRANSFORMATION

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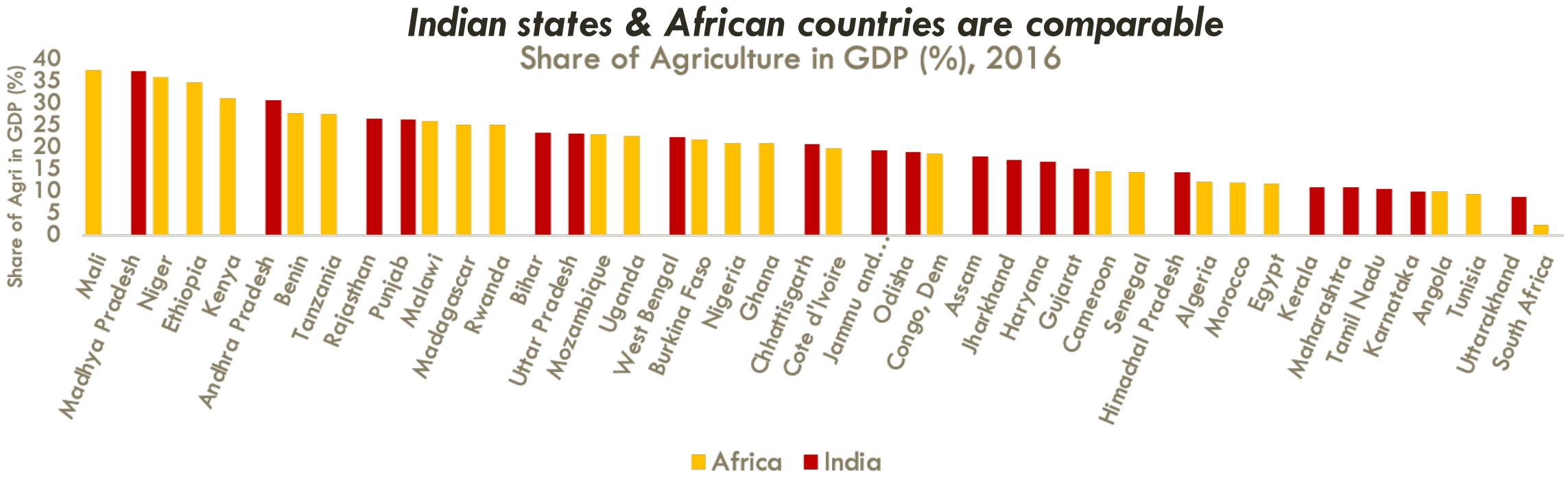
PRESENTED AT THE ZEF-FARA-ICRIER WORKSHOP "AFRICA AND INDIA: EXPERIENCES WITH TRANSFORMATION OF FOOD AND AGRICULTURE AND OPPORTUNITIES FOR LEARNING AND COLLABORATION", 26 NOVEMBER 2021

OUTLINE

- Why this study?
- Research Questions & Methodology
- Findings from Cluster Analysis
- Agriculture performance in India & Africa
- Drivers of agricultural growth in India & Africa
- Drivers of nutritional change in India & Africa

MOTIVATION

- ✓Diverse in natural resource endowments, agro-climatic zones, economic structure & food systems in Africa and India.
- ✓Internal heterogeneity with India and Africa gives the premise of the present study



Source: WDI and MOSPI, GoI, 2016

RESEARCH QUESTIONS & METHODOLOGY

1. What key lessons can be drawn from distinct agricultural growth trajectory between Indian states & Africa countries?

Cluster Analysis: Common typologies between Indian states (20) & African Countries (24) based on Principal Component Analysis & Nearest Neighbor Matching

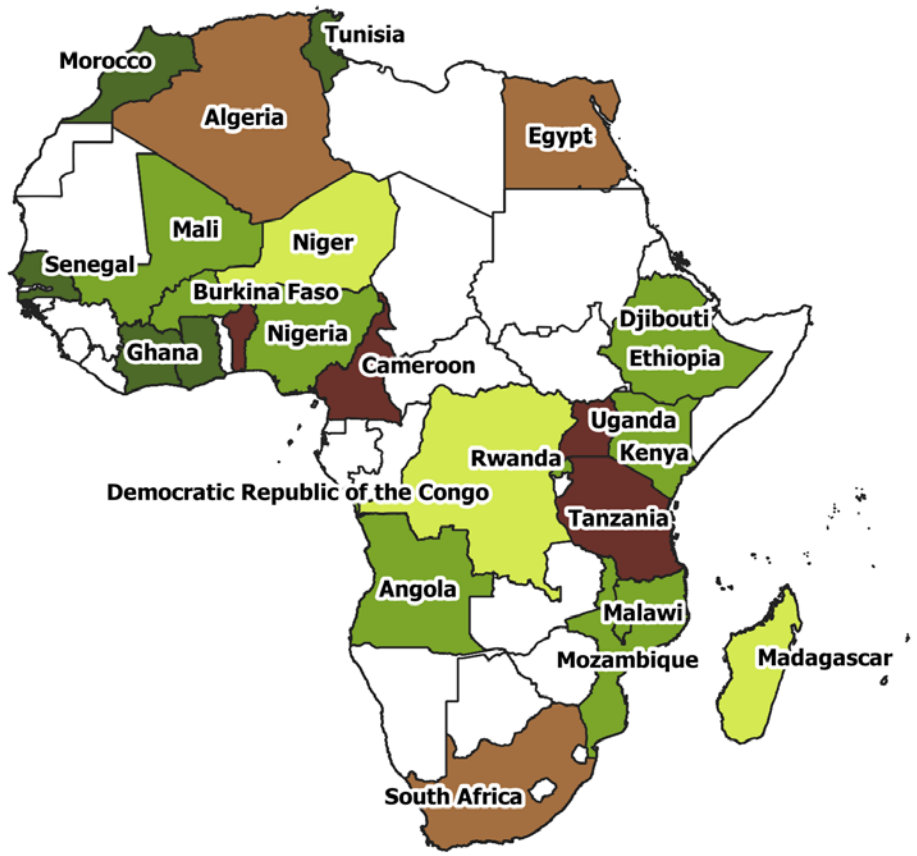
2. What are the key drivers of agricultural growth in both regions?

Panel Data Regression : Separate regressions for Indian states (27) & African countries (24) from 2000 to 2016 to explain Gross value of output (GVOA)

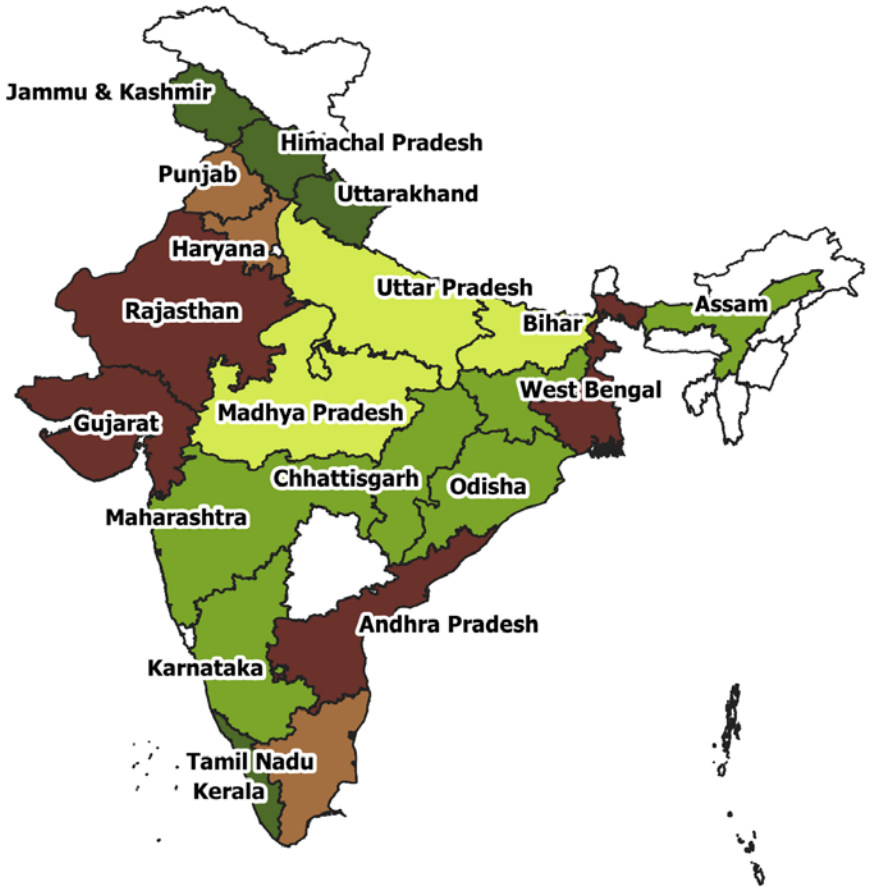
3. How agricultural transformation could improve nutritional outcomes in African countries and Indian states?

Panel Data Regression: Pooled panel of Indian states (27) & African countries (41) since 2000 to explain prevalence of stunting and underweight

CLUSTERS OF COMPARABLE INDIAN STATES AND AFRICAN COUNTRIES



AFRICA



INDIA

Cluster
1
2
3
4
5

Source: Author's Compilation for 2016 data

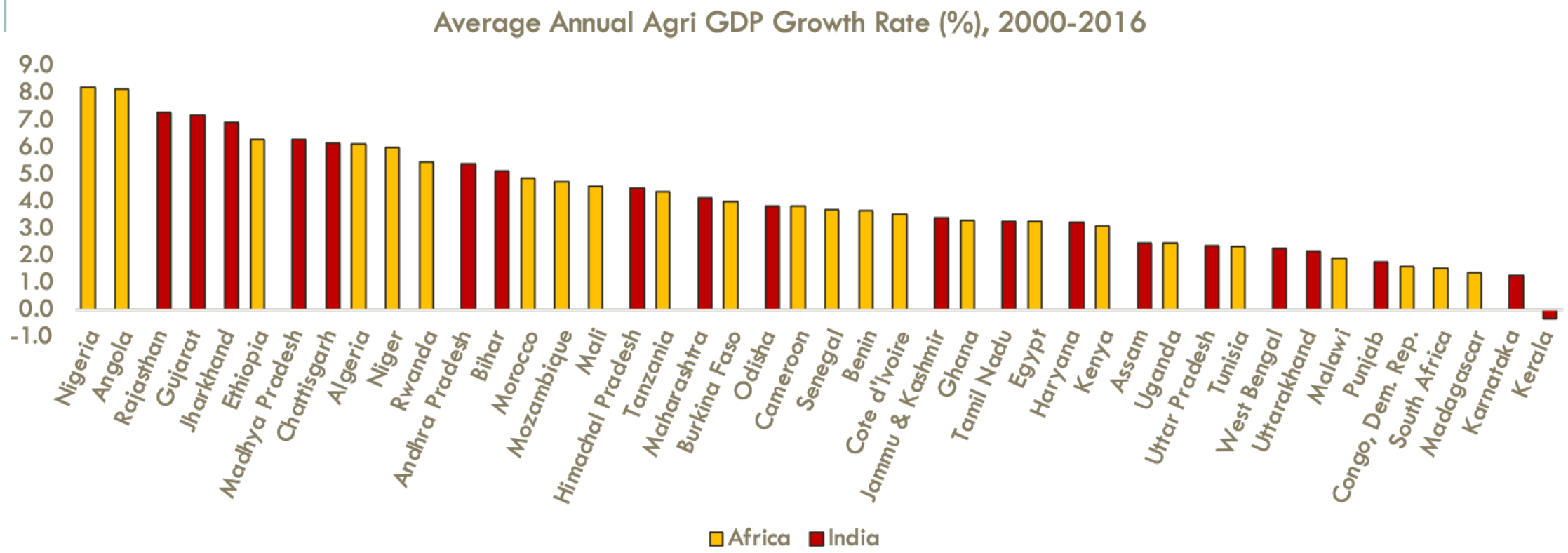
Note: Clusters based on Principal Component Scores of nine variables: Per capita Agricultural GDP, Employment in agriculture, Population, Irrigation ratio, GVOA per hectare, Share of Agriculture in GDP, Share of Livestock In GVOA, Underweight, Poverty (2016 data)

AFRICAN COUNTRIES & INDIAN STATES FALL INTO SIMILAR CLUSTERS

CLUSTERS	Agri growth 2000-2016	Agri productivity (GVOA per ha)	Agri intensification (Access to Input, Irrigation)	Diversified Agri sector (high share of Livestock)	Malnutrition
CLUSTER 1: Gujarat, Rajasthan, Andhra Pradesh, West Bengal **Cameroon, Uganda, Benin, Tanzania**	High	Mixed	Mixed	Mixed	High
CLUSTER 2: Karnataka, Assam, Odisha, Chhattisgarh, Maharashtra, Jharkhand **Burkina Faso, Rwanda, Mozambique, Mali, Malawi, Kenya, Ethiopia, Angola, Nigeria**	High	High	Low	High	High
CLUSTER 3: Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Kerala **Cote d'Ivoire, Senegal, Morocco, Tunisia, Ghana**	Moderate	High	Low	Mixed	Low
CLUSTER 4: Tamil Nadu, Punjab, Haryana **Algeria, South Africa, Egypt**	Low	High	High	High	Moderate
CLUSTER 5: Madhya Pradesh, Bihar, Uttar Pradesh **Democratic Republic of Congo, Niger, Madagascar**	Low	Low	Mixed	Low	High

Source: Author's compilation

HIGH AGRICULTURAL GROWTH IN INDIA & AFRICA SINCE 2000



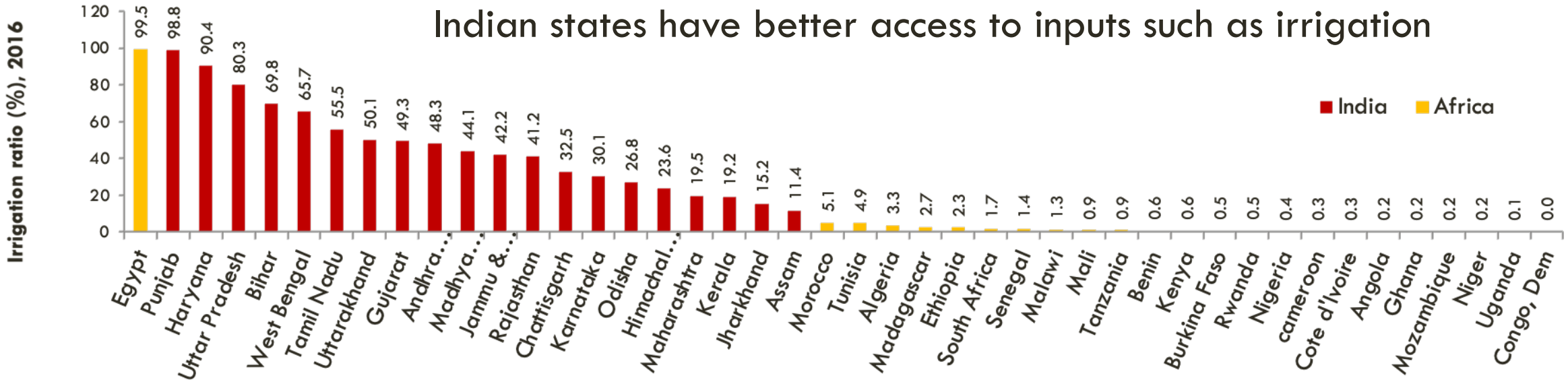
Source: WDI and MOSPI, GoI, various years.

During 2000- 2016

- ✓African agriculture has entered into a period of sustained and remarkable growth since millennium
- ✓India's agricultural sector grew at 3.1% annually, while African grew 4.6% p.a.

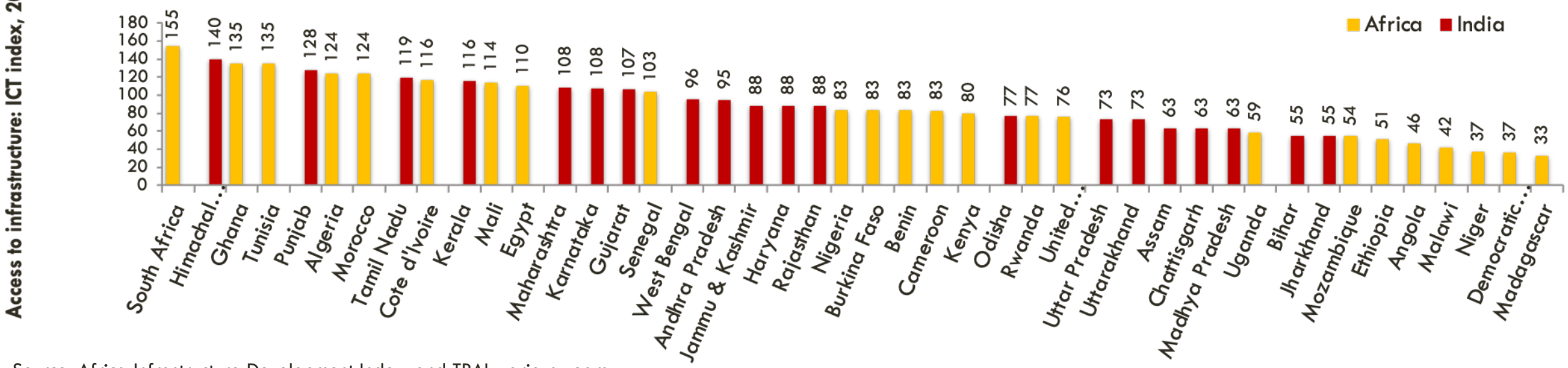
DRIVERS OF AGRICULTURAL GROWTH

Indian states have better access to inputs such as irrigation



Source: DES, GoI; FAOSTAT

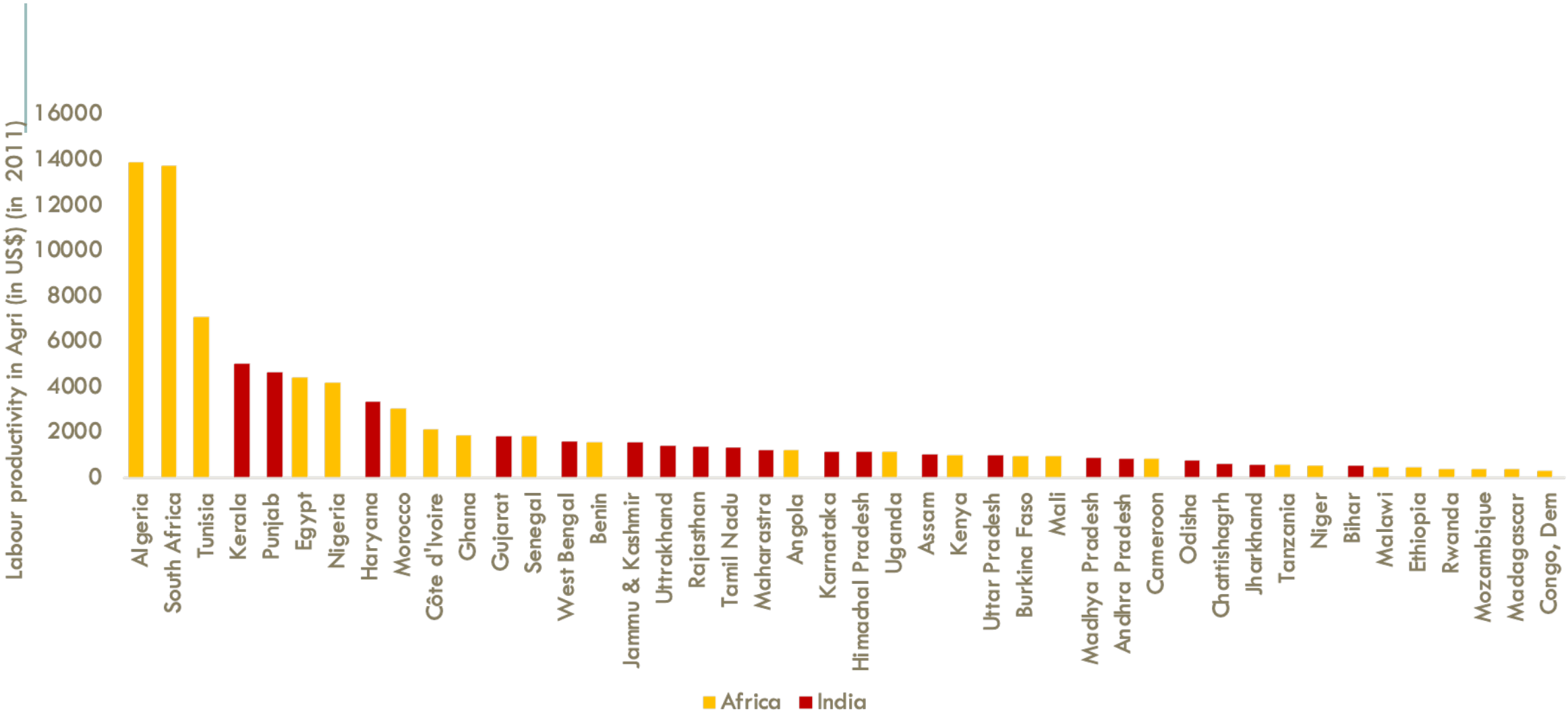
Many African countries have better ICT infrastructure



Source: Africa Infrastructure Development Index, and TRAI, various years

Note: ICT index calculated using the total phone subscription, both fixed telephone lines and mobile cellular telephone subscriptions, given in a year per 100 habitants.

LABOUR PRODUCTIVITY IN INDIA & AFRICA



Source: WDI, FAOSTAT and MOSPI, GoI, Census 2011.

DIFFERENT DRIVERS OF AGRI-GROWTH IN INDIA & AFRICA

Indian states

- Access to inputs (fertilizer, tractors, irrigation)
- Agricultural diversification towards high valued activities
- Sectoral terms of trade (price incentives)
- Convergence across states in agri growth

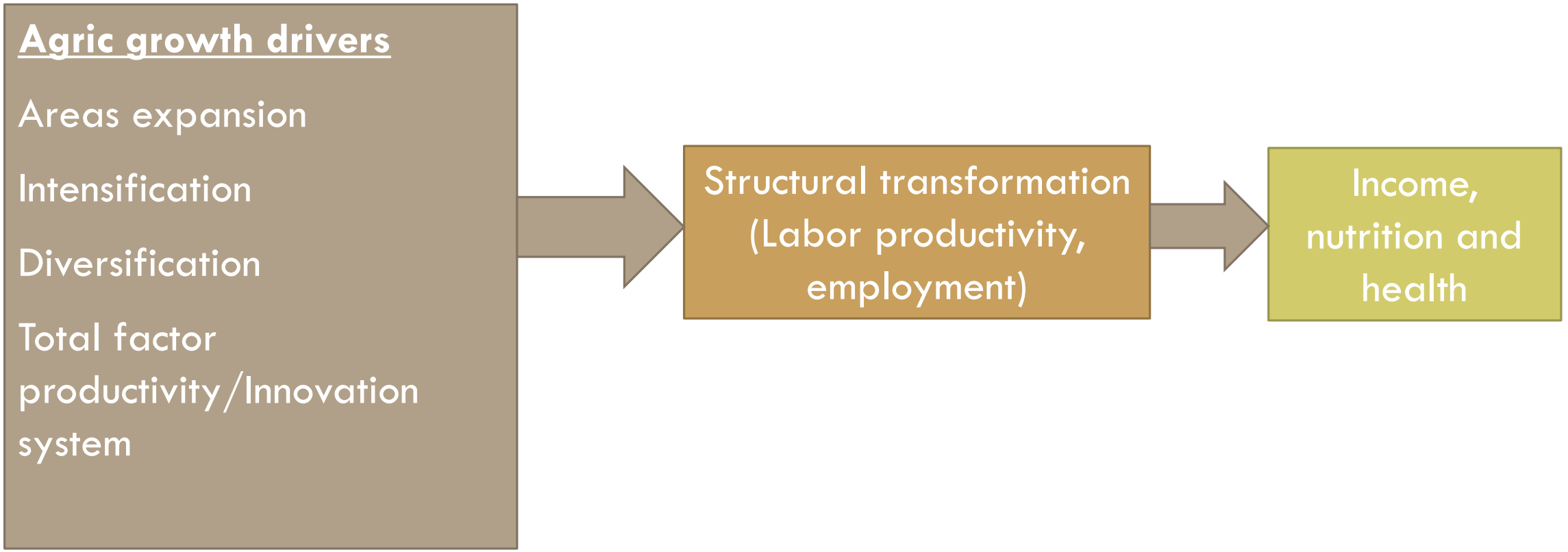
African countries

- Agricultural area expansion
- Agricultural diversification towards high valued activities
- No convergence across countries in agri growth

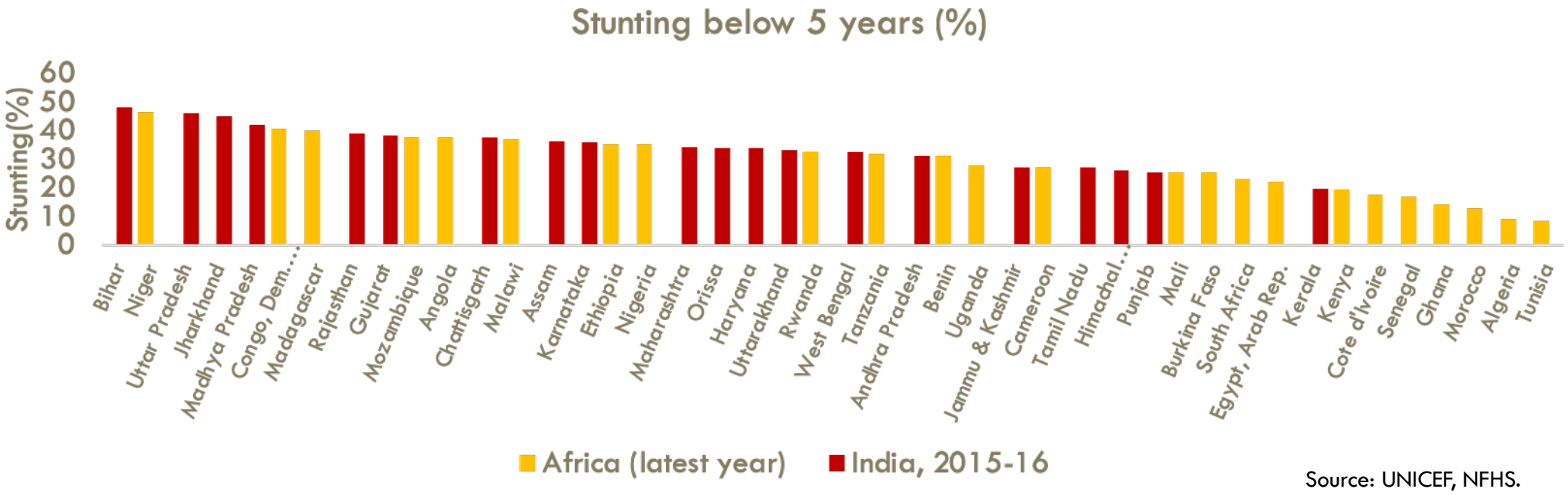
Source: Based on Study's Estimation

DRIVERS OF NUTRITIONAL CHANGE

AGRICULTURAL GROWTH, STRUCTURAL TRANSFORMATION, AND NUTRITION



HIGH PREVALENCE OF STUNTING IN INDIA & AFRICA DESPITE PROGRESS SINCE 2000



Source: UNICEF, NFHS.

- Prevalence of undernutrition has declined in both Indian and Africa, but India show a higher percentage point (11%) reduction in under-five child stunting
- Agriculture plays a vital role both in Africa and India economies, but the empirical evidence on the link between agri-growth and nutritional outcomes is mixed (*Kadiyala et al., 2014; Subramanyam et al., 2011; Smith & Haddad 2002, 2015*).

ASSOCIATIONS BETWEEN GROWTH AND NUTRITION

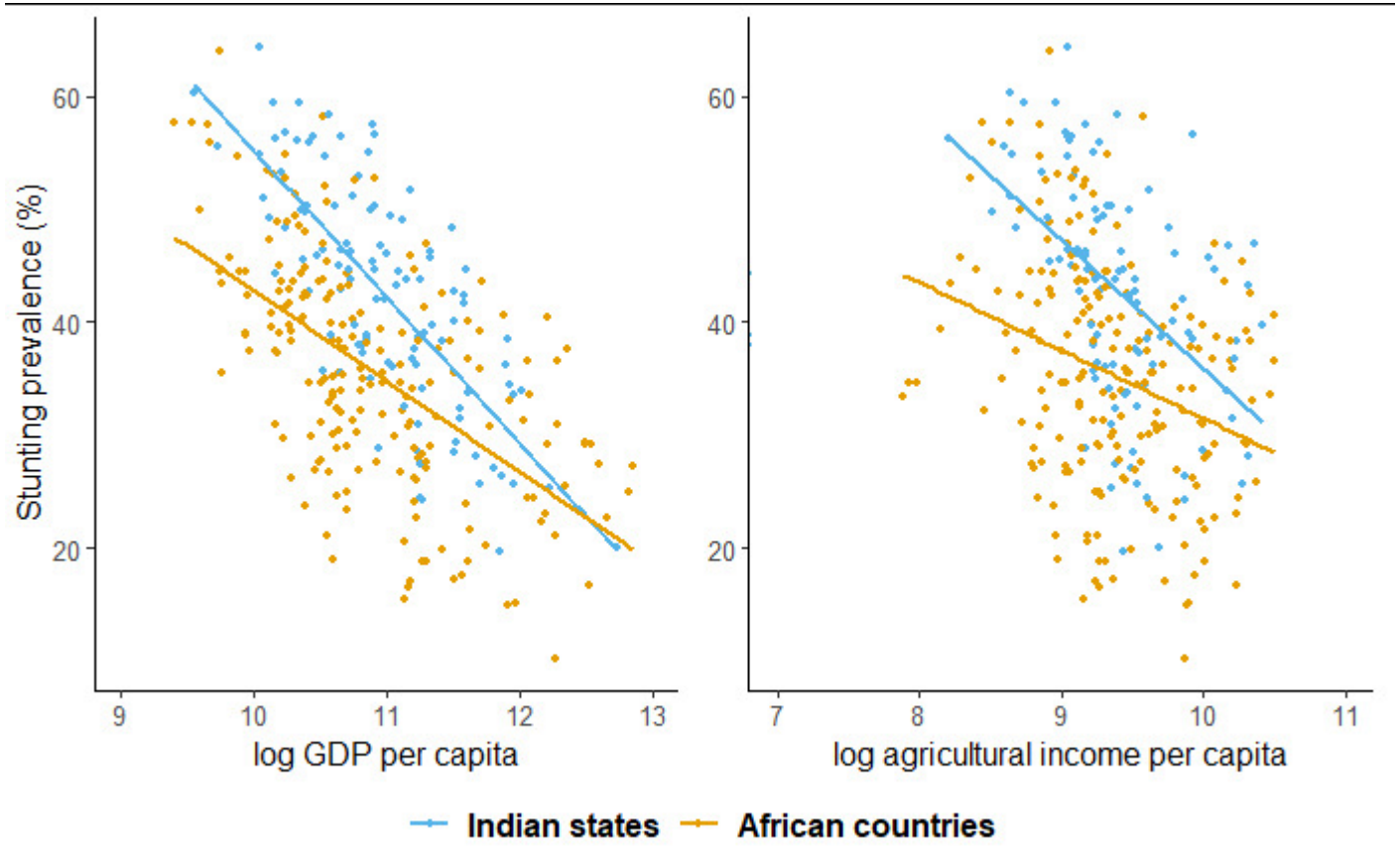
Growth-nutrition (stunting) elasticities

Indicators	Full sample (N=312)	Africa (N=204)	India (N=108)
GDP per capita	-.24***	-.23***	-.33***
Agricultural income per capita	-.19***	-.17**	-.27***
Agriculture value added (% GDP)	.22***	.20***	.29***
Agriculture employment share (%)	.41***	.38***	.50***

Note: statistical significance, *** p<0.01, ** p<0.05

- Growth in GDP p.c. has a greater impact on stunting than growth in p.c. agricultural income

GDP and agricultural income per capita as a function of stunting

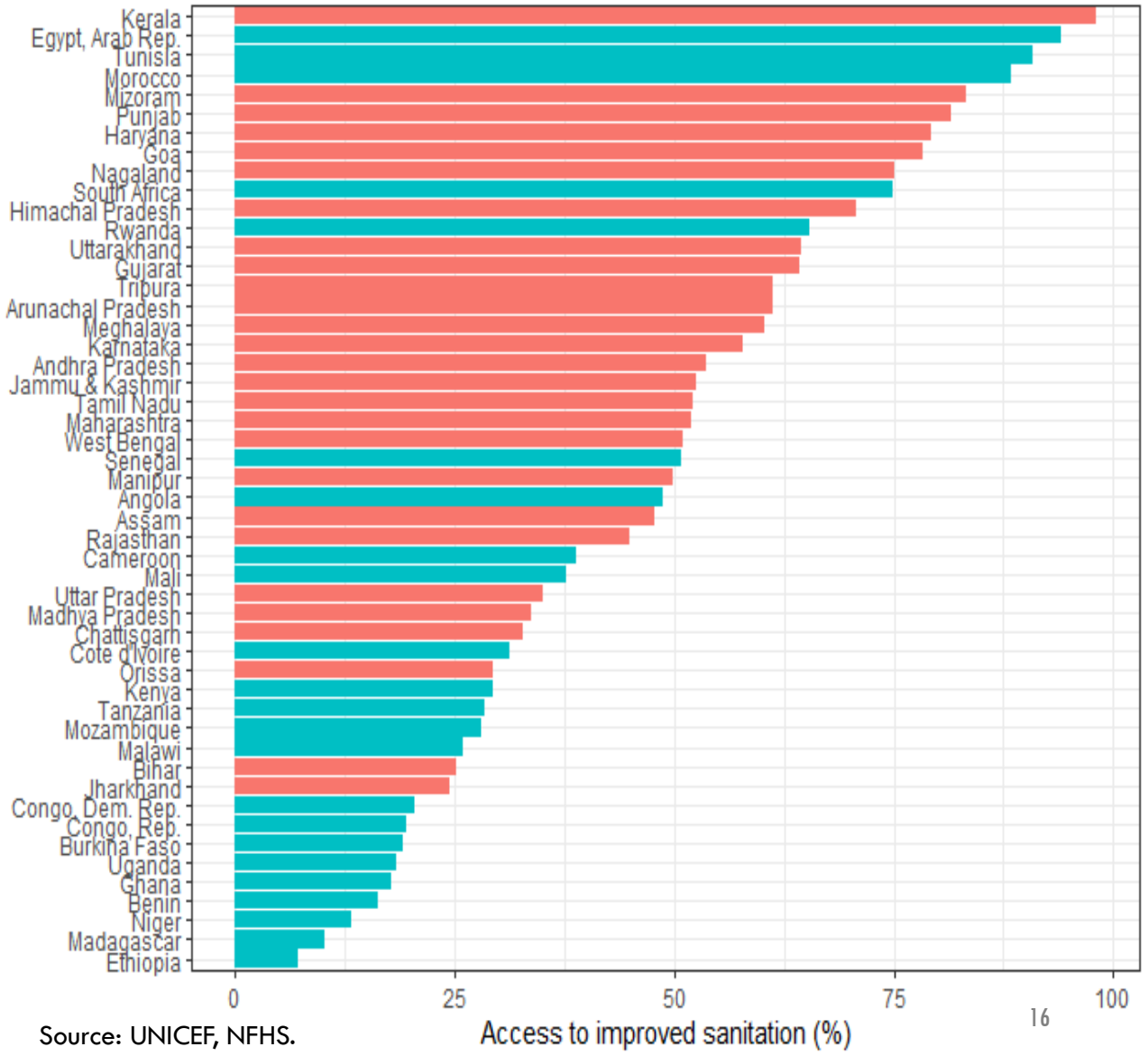


INTEGRATED SET OF POLICIES NEEDED FOR IMPROVED NUTRITION

Other key drivers of undernutrition

- Access to improved sanitation
- Improved access to water supply
- Female school enrollment as indicator of women empowerment
- Share of rural population

➢ Nutrition-sensitive policies (biofortification, targeted transfers)



Source: UNICEF, NFHS.

OBJECTIVE AND INDICATIONS

✓*What are comparable patterns that could inform strategies for transformation in agriculture and food systems within Indian states & African countries?*

- Agricultural and income growth performance; innovation

✓*What are the key drivers of agricultural growth in both regions?*

- Different & common drivers, intensification, area expansion, diversified agri-sector

✓*How agricultural transformation could improve nutritional outcomes in African countries and Indian states?*

- Agricultural transformation through productivity gains; integrated set of policies

To be discussed in the panels

THANK YOU